SYSTEM 7.0 SHIPS: PAGE 194 • GETTING STARTED WITH 7.0: PAGE 269

MACWORLD

The Macintosh® Magazine

July 1991 $3.95 Canada $4.95

UPGRADES

Protect Your Investment and Build a More Powerful Mac

040

27 ACCELERATORS

MW LAB

SYSTEM 7: WHY YOU NEED IT

030

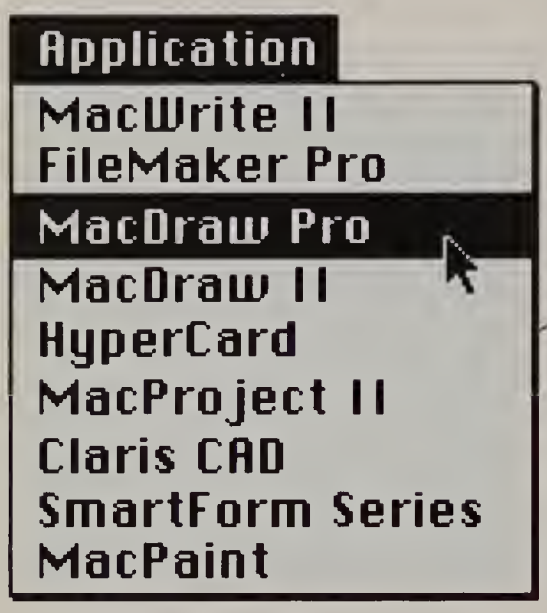
TYPE RENAISSANCE: PART ONE

66 HARD DRIVES

MW LAB

020

What would w
everybody used



More compatible

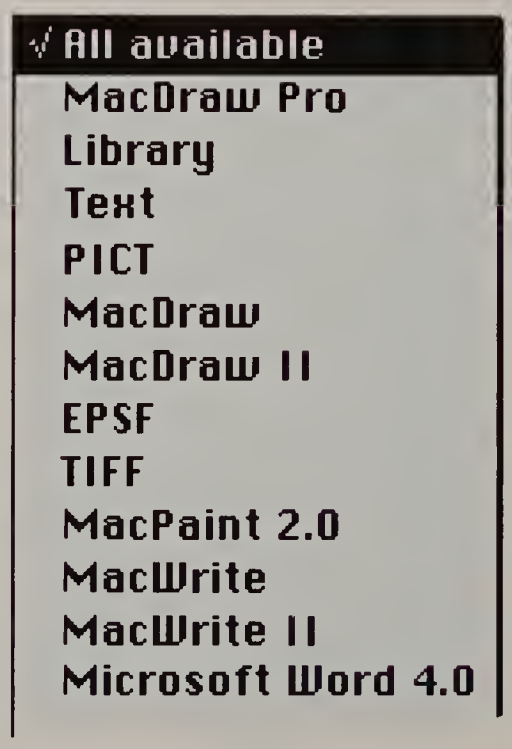
MacDraw Pro is part of the Claris® family. Which means it shares dictionaries, file translators and a common look and feel with other Claris software. You also benefit from Claris support.

More presentable

Show your work on-screen, on overheads, or even on 35mm slides. Move slides from one file to another, and print handouts with multiple slides on each page.

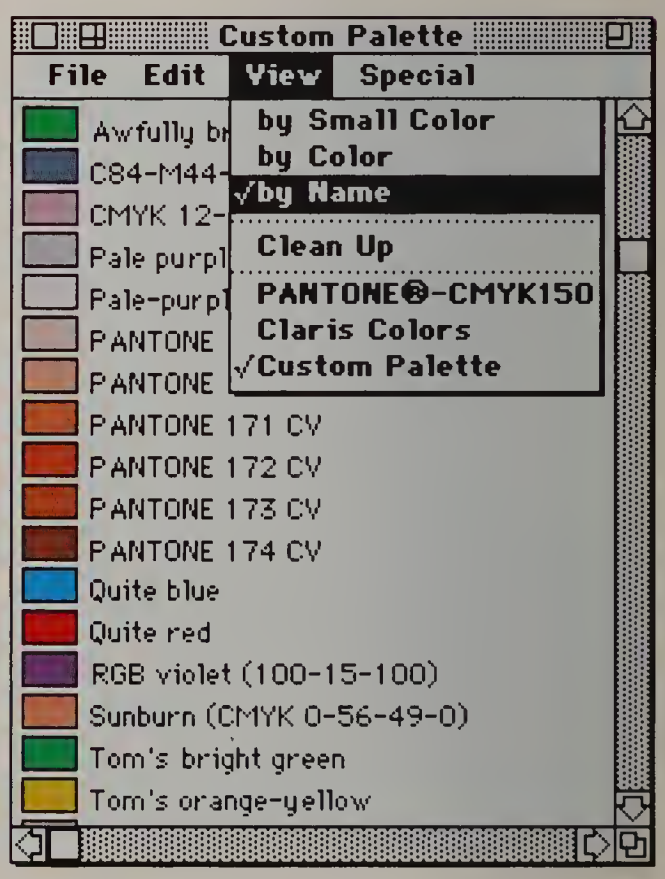
More publishable

MacWrite-style text handling gives you full formatting power in every paragraph of every text block. Composing text, scanned images and graphics is simple.



More sharing

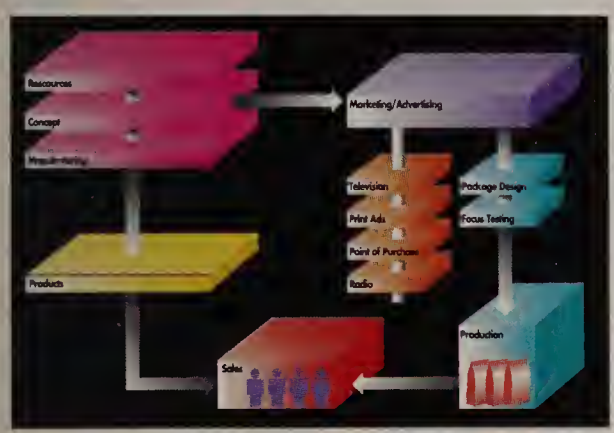
Claris' XTND turns MacDraw Pro into a "graphics hub" for all your applications. You can import virtually all clip art files using the formats above and output your finished work in an EPSF file for precision publishing.



More colorful

Create custom palettes, choosing from millions of colors — including standard PANTONE® colors. You can also custom-name colors for faster, easier reference.

ork be like if MacDraw Pro?

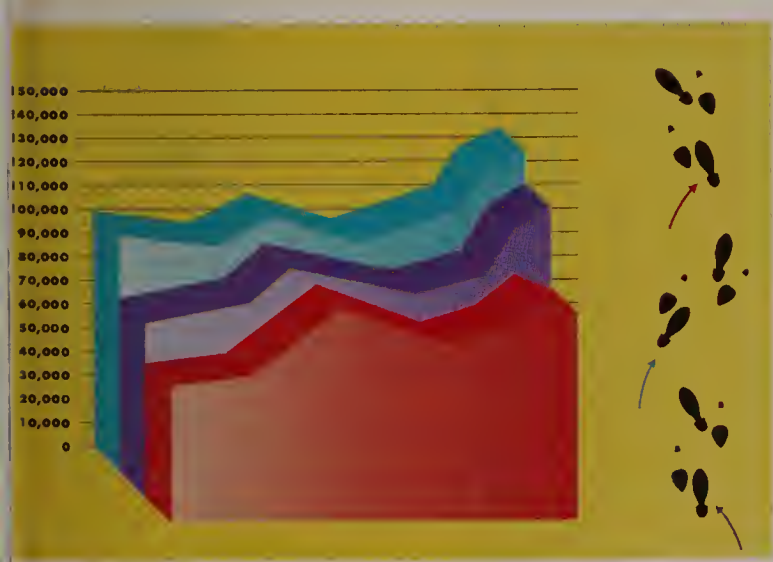


More productive

MacDraw Pro lets you concentrate on your work, and not on the software. When needed, context-sensitive help is always available.

Well rounded

Imagine drawing true Bézier curves without handles. (You can draw the figure above with just nine clicks. Try it.) There's no easier way.



More graphic

You have three customizable ways to add highlights or shading to your graphics and presentations. You'll look more professional, both on screen and on paper.

New Product

More Rewarding

Could your job use some exciting changes?

Well, here's our best idea yet: the new MacDraw® Pro.

We've taken the graphics tool you know and love – MacDraw II – and stuffed it with power and new features. More than 100 new features in all.

Yet for all its graphic power, MacDraw Pro remains one of the most comfortable and accessible tools since the T-square.

It's the ideal, all-around graphics software for presenting, publishing, designing and illustrating!

Allow us to illustrate.

Curves. A hassle with most drawing programs; no big deal with MacDraw Pro. Just use your mouse to click out the general shape you want, and presto. If you need more precision, you can use standard Bézier handles to fine-tune what you've drawn.

Colors. With MacDraw Pro you create your own custom palettes, and keep as many open as you wish. You can even name each color, so your "logo blue" is never confused with your "sky blue."

Text. It's the Achilles' heel of most graphics software – but not this one. You'll work with the same powerful formatting tools that our MacWrite® II software is famous for.

The result: instead of inventing unheard of tools that do new things, we let you use familiar tools to do unheard of things. In other words, simply powerful software.

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CONTENTS

On the Cover
Choosing an upgrade strategy is more complicated than ever—but our upgrade feature, page 176, helps you find the best way to modernize your Mac. (Photo by Paul Franz-Moore.)

In News
RasterOps' CorrectColor Calibrator for 24-bit monitors, printers, and scanners, page 153.

DEPARTMENTS

How to Contact Macworld 12

MacBulletin 17

Commentary/Jerry Borrell 23
Technology and publishing, part two.

Letters 39

Art Beat 63
By Cathy Abes

The Iconoclast 69
By Steven Levy A cautionary tale for little guys in the marketplace.

Conspicuous Consumer 141
By Deborah Branscum Information sources that help you explore the Mac.

News 153
By Dan Littman and Tom Moran

New Products 253

How To/Quick Tips 263
By Lon Poole

How To/Getting Started with System 7 269
By Jim Heid

How To/Insights on WordPerfect 2.01 281
By Charles Seiter

Updates 293

Where to Buy 299

Best-Sellers 346

FEATURES

Keeping Current 176

By Brita Meng Don't retire that aging Mac—revitalize it. The right upgrade can mean a much-needed boost in performance and capabilities.

The High and the Mighty MW LAB 184

By Robert C. Eckhardt High-capacity hard drives are better and cheaper than ever. Macworld Lab analyzes 66 models of 300MB or higher drives to find this year's top choices.

Confessions of a System 7 User 194

By Lon Poole Now that Apple's long-overdue system upgrade is finally here, should you install it? For at least 18 good reasons, the answer is an emphatic yes.

The Accelerated Course MW LAB 210

By Adrian Mello Do you crave a speedier Mac? Macworld Lab tests 27 accelerator boards to help you decide whether to trade in your Mac or accelerate it.

Type Renaissance 202

By Alex Brown This first in a four-part series on Mac typography explores the evolution of digital type and how it works—in theory and practice.

TYPE in Transition *Part 1*

Type Renaissance *A primer on digital typography—how it evolved, how it works, and how to make it work for you, page 202.*

REVIEWS

WordPerfect 2.0 220
Word processor.

Oasis 1.0 221
Paint software.

StuffIt Deluxe 2.0 222
File-compression utilities.

Crystal Ball 2.0 226
Forecasting and risk-analysis software.

DiskFit 2.0 and Network DiskFit 2.0 228
Backup utilities.

MiniCad+ 3.0 231
2-D/3-D CAD program.

Mitsubishi SC-7500 233
400-dpi color flatbed scanner.

Paper Keyboard 1.2 234
Handwritten form-recognition software.

Now Utilities 2.03 239
Utility collection.

Mac School 3.0 242
School administration software.

GraceLAN 1.1.1 244
Network-management software.

Image Grabber 2.0 246
Screen-capture desk accessory.

Window Shopping 249
One Shot 1.0; TypeChart 1.0; ResumeMailer 1.01; digiMatic 1.0; Enchanted Journey; Trick or Treat; Real Estate Investment Analysis 7.0; Manage Your Closet 1.0.

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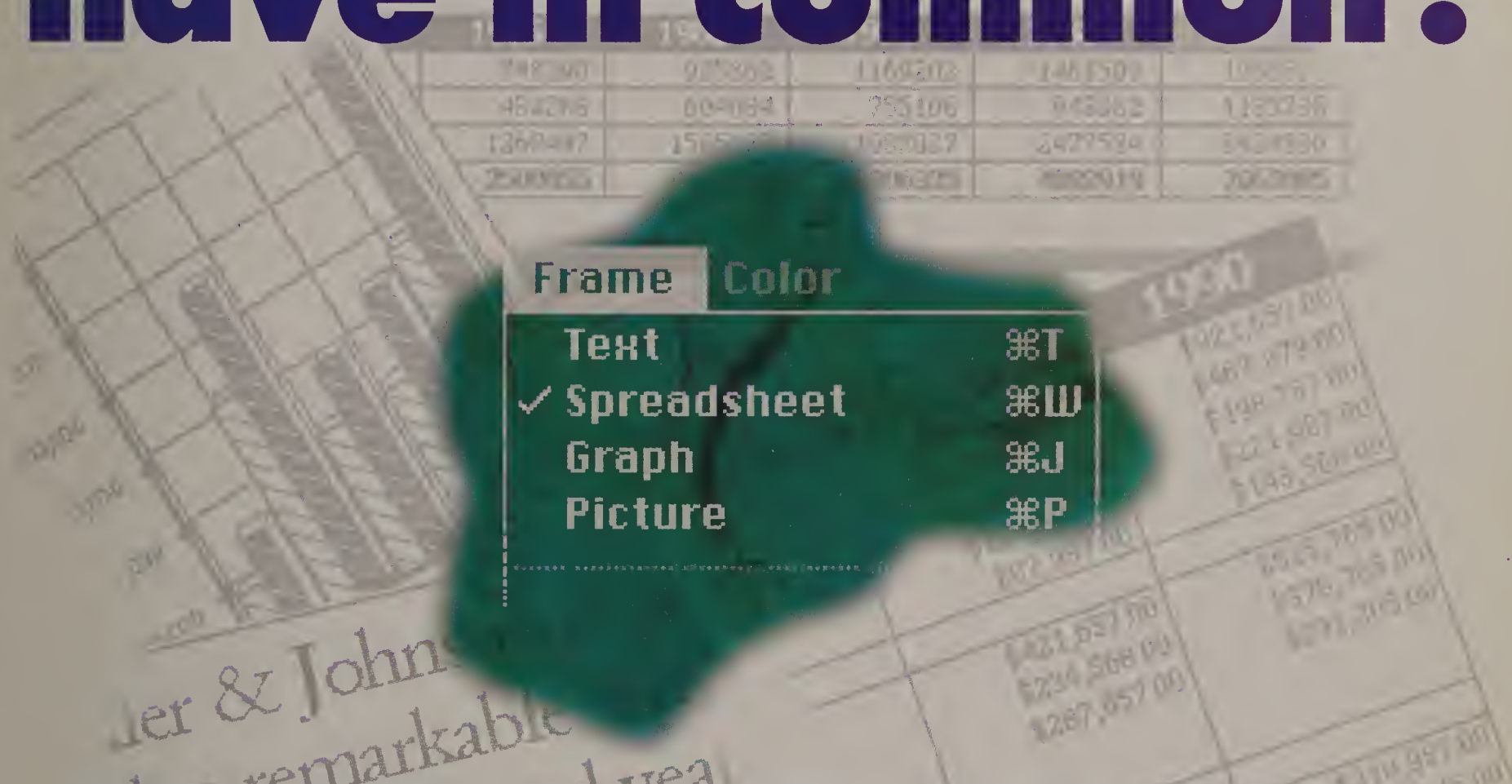

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Color monitor illustration by Rob Mageira.

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*Disk Doubler not available with 45MB removable

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MACWORLD, MAY, 1991

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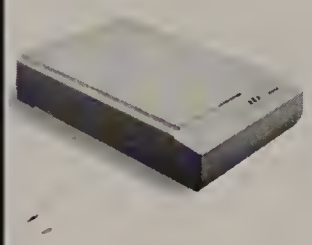

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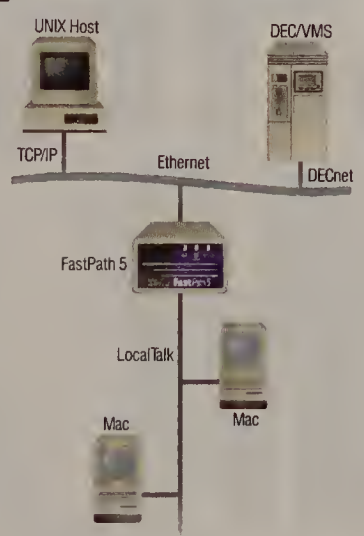

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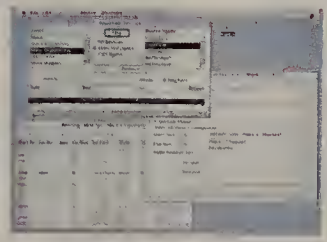

*But what if you're one of the thousands using FastPath 4? Shiva's made it easy to get a free upgrade kit (which includes software and a PROM, a $149 value), or a special offer on a trade-in if you act before September 30, 1991.**

Take advantage of our free upgrade, or our special trade-in. Just call 1-800-458-3550. Or 617-252-6300. You may find that by using the newer, faster, better gateway, your stature around the company will, well, get bigger.

Shiva FastPath®5

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*Trade-in offer is good for any FastPath or competitive hardware products. The trade-in enables you to purchase a FastPath 5 at $1,299 until September 30, 1991 The free PROM and software upgrade is limited to one per company – additional PROMs can be purchased in ten packs for $150 All product names are trademarks or registered trademarks of their respective manufacturers

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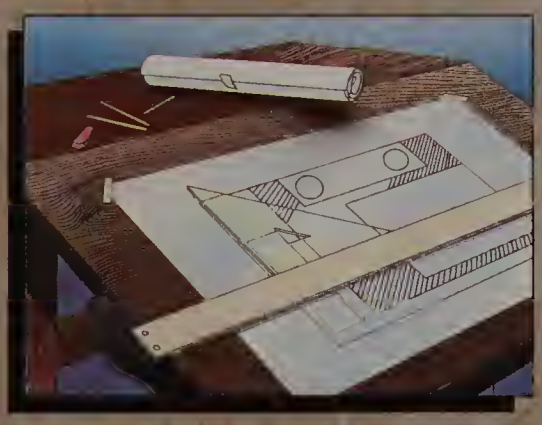
BPA IDG

The Evolution of CAD

From the beginning of time, man has tried to express himself through graphics.

In the beginning man had to use primitive tools for creating graphic designs.

In the 15th Century design tools were quill ink pens and crude styles of paper.



By the 18th Century man had advanced to the drafting table with the T-squares, slide rules, precision ink pens and the dreaded eraser.

In the 20th Century the first CAD programs were very slow and extremely difficult to use, not to mention the expense of buying them.

As programs became easier to use, they thought they were radical and intelligent, but lacked real CAD power.

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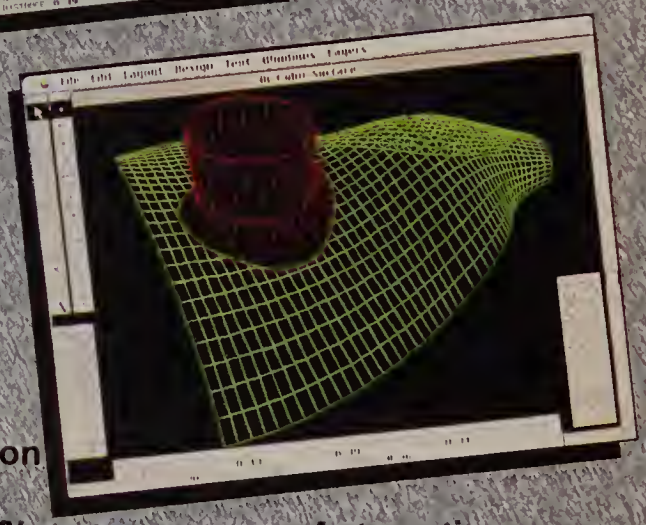

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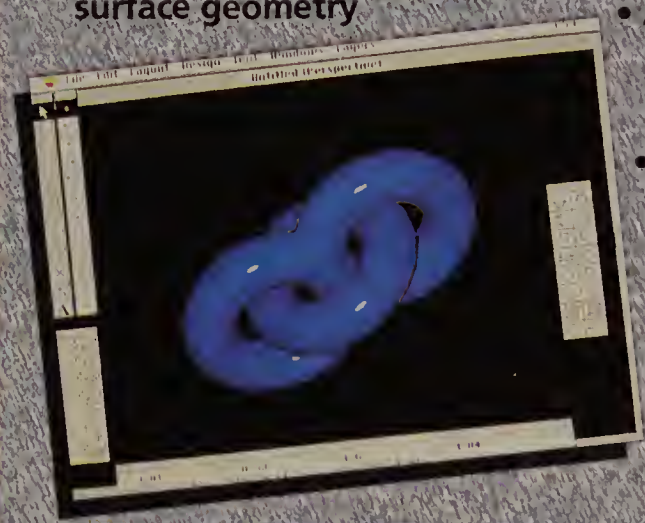

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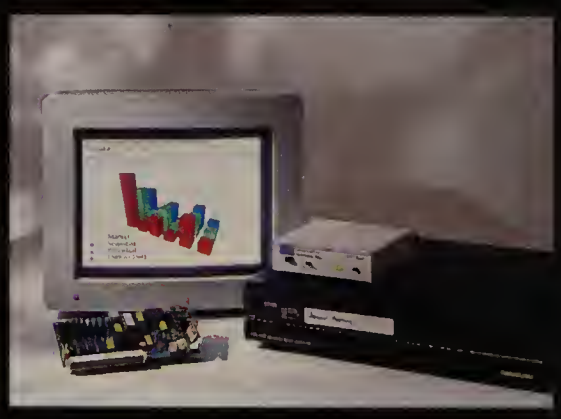

8-Bit Video Output Adaptors allow Macintosh II images and presentations to be captured on video tape. Available in NTSC and PAL versions.

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MacBulletin

21-Inch Apple Monitor Sparks Protest

A 21-inch color monitor that Apple is expected to announce in early June is being protested by some third-party monitor makers and international distributors who say the monitor will hurt their business and possibly reduce the number of distributors who carry Apple-related products internationally. The two-page monitor will be made by FIMI, a subsidiary of Philips Italy; will have reduced magnetic-field emissions; and will be bundled with an 8-bit graphics adapter, according to sources inside Apple and at third-party vendors briefed by Apple. "If they bring it out, then companies such as RasterOps, Radius, SuperMac, E-Machines, PCPC, and others will probably find that their [large-screen] 8-bit sales will drop off completely," said Randy Green, executive director of the Federation of International Distributors, a not-for-profit association in Boston. The monitor's features, combined with the Apple logo and a rumored low price, could be deadly for the third-party vendors, according to Green. Green and the third-party sources said that Apple had already made a concession by not bringing the monitor out in the United States. However, the monitor is expected to be available in Canada and Mexico, making a U.S. gray market possible.

Quark and Scitex Settle

Quark and Scitex have settled a dispute that forced Scitex to stop marketing Visionary, a version of QuarkXPress that can read Quark files and send them to a Scitex prepress system. Quark, which developed Visionary for Scitex, wanted Scitex's permission to make Visionary capable of saving files in a format that QuarkXPress could read, but Scitex refused. The agreement calls for Scitex to take over Visionary and develop it as an add-on to QuarkXPress. The Visionary Xtension, as the new product will be called, will probably not allow QuarkXPress to open its files.

What's True at Letraset

FontStudio 2.0 can create TrueType fonts and convert Type 1, Type 3, and LetraStudio fonts to TrueType format. It can also interpolate between heavy and light weights to create intermediate weights, and automatically add hinting. It lists for $595. LetraStudio 2.0 incorporates Pantone's tools for precise matching of Pantone, RGB, and CMYK colors; antialiases the color channels as well as the black; imports Illustrator 3.0 outlines directly; and supports copying and pasting the "envelopes" that contain font-manipulation information from one block of text to another, as well as saving envelopes as templates. It can perform distortions on all four sides of a text block at one time, and screen-rendering speed is greatly increased. Pricing for LetraStudio 2.0 was not set at press time. Letraset is at 201/845-6100.

Farallon Rewrites Sound Edit to Work with 6.0.7

Farallon Computing said recently that it has rewritten its Sound Edit utility to enable its Sound Recorder to work with Apple's new Sound Input Manager in System 6.0.7. Apple designed Sound Input Manager to work with the microphones and other hardware included with the Macintosh LC and the IIsi, but the software was incompatible with several third-party sound-editing utilities, according to Farallon. For upgrade information, contact Farallon at 415/596-9100.

Apple Says Macintosh Shipments Up by 85 Percent

The total number of Macintoshes shipped in Apple's second fiscal quarter was up by about 85 percent over the same quarter a year ago, Apple said. Apple chairman John Sculley attributed the increase to the company's strategy of lowering prices and gaining market share.

Rush Hour

One of the first announced utilities for managing the complexities of System 7.0 is Traffic Controller, which will monitor AppleEvents—communication between applications—and enable users to intervene by, for example, redirecting an IAC call to a different application. Traffic Controller will also let users examine a log of publish-and-subscribe relationships; keep several iterations of intertwined files and roll them back to earlier versions; and provide information about network AppleEvents for network administrators. Single-user Traffic Controller will list for $129, and the network version for $249. For more information, contact Tactic Software at 305/378-4110.

Toshiba Shows Speedy CD ROM Player

Toshiba America Information Systems has announced the TXM-3300A, a fast CD ROM player with an average access time of 325ms. Unlike most CD ROM players, the drive has improved seals to prevent

(continues)

contamination by dust, and it automatically cleans the read lens for greater reliability. The TXM-3300A, slated to ship in July, comes in versions with interface kits for IBM PCs and compatibles or Macs. The Macintosh version will have a suggested list price of $895. For more information, contact Toshiba at 714/583-3000.

Ethernet Hits New Low at $199

Start-up vendor Sonic Systems says it has begun shipping two series of Ethernet boards for Macs at a cost of $199 each, considerably less expensive than other Ethernet devices. The Ether TnT series all have a thin Ethernet interface, and the Ether TwT series of 10BaseT boards connect via twisted-pair cable. All the boards are compatible with AppleTalk Phase 1 and Phase 2 protocols, which means they can communicate using those protocols over Ethernet and connect more easily to AppleTalk networks. The company said it ships both series in versions that work in the Macintosh SE, SE/30, LC, and all Macintosh II machines. The $199 price is a firm figure, since the company sells direct. For more information, contact Sonic Systems at 408/725-1400.

Kodak Gives Away Color Tool

Eastman Kodak is releasing a public domain utility for decompressing color images compressed with the company's Colorsqueeze, a $179 application. The utility is available on most online services. Kodak is also developing a system to convert images from photographic film to digital format and save them on a CD ROM. Kodak is at 716/726-3437.

HP Drops Price of DeskWriter Again

Hewlett-Packard recently cut the suggested retail price of its popular DeskWriter ink-jet printer for the Mac from $995 to $729. The cut came not long after Apple introduced its low-cost StyleWriter and Personal LaserWriter LS. For more information, contact HP at 800/752-0900.

AppleTalk's New Voice

Like most network-management tools, TalkManage can watch activity on a network; decode packet headers; and record traffic levels, transmission errors, and similar information, and display the information in real time on a histogram. But it also has some unusual features. Currently shipping version 1.4 can send a message on its own or use QuickMail to inform someone when a network event triggers an alarm—for example, informing the net administrator when a device disappears from the net. TalkManage generates a map of a network (in 1.4 the map is resizable) and provides tools for analyzing network layout and designing more-efficient networks. From within TalkManage you can also configure most AppleTalk routers, including those from Cayman Systems and Shiva. Version 2.0 will provide similar tools for Ethernets, including configuring a VAX-based Ethernet using DEC's DECmcc; will be able to send messages with Microsoft Mail; and will support the Simple Network Management Protocol, which Apple has finally settled on as its AppleTalk standard. Pricing depends on network configuration. For more information, contact Distributed Technologies at 617/684-0060.

Silicon Graphics to Discontinue Mac Development?

Silicon Graphics Inc. (SGI) recently said that it will likely discontinue any development of its highly regarded IRIS 3-D graphics software for the Macintosh. In early April Silicon Graphics signed a technology agreement with Microsoft to integrate SGI's IRIS Graphics Library into Microsoft's applications and system software. At the same time, Compaq Computer and SG announced a strategic relationship and Compaq acquired 13 percent of SGI's stock.

Apple II Board for the Mac LC Shipping

Apple said it has begun shipping the Apple II emulation board designed for the Macintosh LC. The Apple IIe Card was designed to let schools and others buy Mac LCs without losing the benefit of the Apple II software they already have. The board is compatible with most of the thousands of Apple II applications, according to Apple, and can support an external Apple II 5¼-inch floppy drive and an Apple joystick. The card's suggested retail price is $199. For more information, contact your Apple dealer.

The Future of Fax

The TR-29.2 committee of the Telecommunication Industry Association is establishing a new fax-modem standard, Class 2, which moves responsibility for timing control from the computer to the fax chip. The committee may also require fax-modem chips to detect when the computer's serial port overflows and loses data. Committee member Tom Evslin, whose company Solutions markets Macintosh fax-modem software, says the Mac's tiny 3-byte serial port buffer is especially vulnerable to data loss, and that on-chip detection would let fax modems run reliably in the background. Class 3 modems, which are years away, will free up the computer from imaging tasks—for example, converting QuickDraw or PostScript to a fax bitmap.

DiskExpress Ready for System 7

Version 2.07 of the disk-optimization utility DiskExpress II is designed to cooperate with System 7's complexity. It can defragment a volume that several people on a network are sharing with FileShare, without disturbing users' access privileges; notice and optimize around blocks marked as unusable by System 7; and operate in virtual memory and large RAM environments. It will list for $89.95. For more information, call ALSoft at 713/353-4090. ■

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PixelPaint Pro *defined* the category of Professional Color Paint. Now, version 2.0 extends the Paint category into artistic image processing. Demanding designwork requiring image compositing, 8-bit masking, transparency and antialiasing or special effects such as embossing, patterning, tinting or controlled warping is dramatically simplified. Photographs can be turned into spectacular art with a few commands or brushstrokes. And precision controls and full color separations mean your designs come out looking the way you expect them to look.

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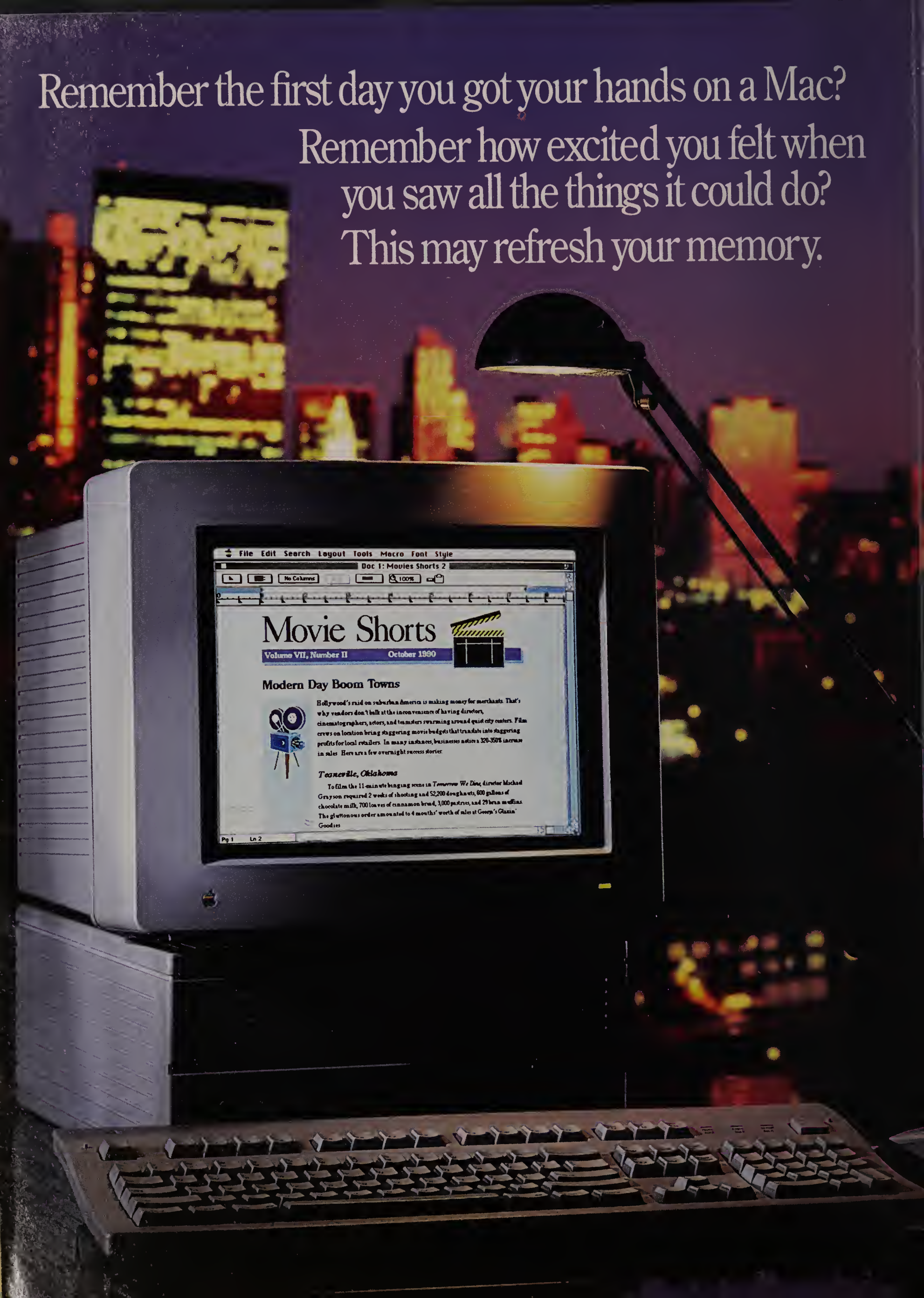
And, if you enjoy working with physical media, Pro 2.0 has the tools you've been searching for! PixelPaper™, which simulates textured surfaces such as linen, charcoal paper or even concrete, and pressure sensitive brushes, charcoals, pastels and airbrushes, combine to create outstanding, natural, painterly effects on a computer. In autoscrollable documents up to 4000 x 4000 pixels. All with the flexibility of Macintosh®-assisted design—Pro 2.0's object-oriented paint tools allow you to continue manipulating your strokes before applying them to your image.

SUPERMAC

With Second Generation Interface Breakthroughs
A second generation in Paint, Pro 2.0 is easier to use than ever before because the interface has been redesigned with the designer's needs in mind. Floating palettes and multiple documents allow you to immediately access and apply tools without climbing through a jungle gym of menus. And, with Balloon Help under System 7.0, Pro verbally tells you what each tool will do.

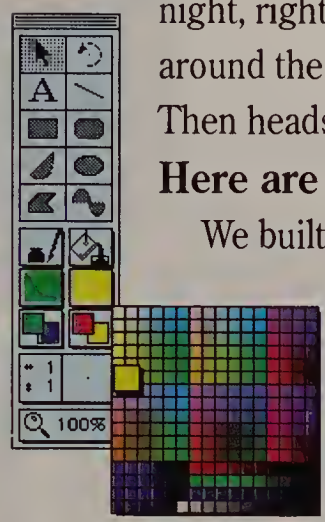
Buy PixelPaint Professional 2.0 *now* and receive a CookBook tutorial ($19.95 value) free when you return your registration card. Call 1-800-624-8999 (x. 210B) for more information about Pro 2.0.

Remember the first day you got your hands on a Mac?
Remember how excited you felt when you saw all the things it could do?
This may refresh your memory.



Introducing WordPerfect® 2.0.

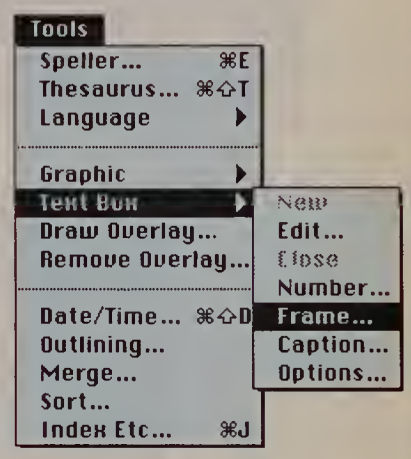
Every once in a while a new product comes along that sparks the same kind of excitement you may have experienced with your first Macintosh (you stayed up half the night, right?). As we've shown new WordPerfect® 2.0 to Macintosh users around the country, we've seen a very similar reaction. First eyes open wider. Then heads start to nod. Followed by grins that stretch dimple to dimple.



Here are some of the more graphic improvements.

We built a graphics and drawing package right into the program. With WordPerfect 2.0, you don't have to leave your document to incorporate graphics. You can create, edit, size, scale and crop graphic figures just by clicking "graphics" or "draw" on the pull-down menu. The palette includes all of the standard drawing tools, plus Bezier curves, polygons and a free rotation tool.

WordPerfect 2.0 also lets you create text boxes. Inside your text boxes you can change font size and attributes. Then you can drag your text box wherever you want in your document and the rest of your text will wrap around it automatically.



The list of new features could fill a page. Or up to 24 columns.

By clicking and dragging icons on the new WordPerfect ruler, you can create columns (newspaper or parallel) and then adjust the column settings, align text, set tabs, change line spacing, move margins and do a number of other formatting changes to your document.

Want to add a border to text, paragraph, column, or page? Easy. WordPerfect 2.0 gives you 36 different border styles from which to choose.

Like working with Styles? WordPerfect not only lets you use them, you can also share your styles with other people on your network.

We've also added new features like a Macro Editor, Tables of Authorities, and Line Numbering. And we've made enhancements to Merge, Search and Replace, and Macros.

Of course, what counts is how you feel.

See WordPerfect 2.0 up and running at your dealer. Better yet, buy a copy of WordPerfect 2.0 and load it onto your Mac. But when you try WordPerfect 2.0 for the first time, one word of warning. Don't plan on going to bed early.

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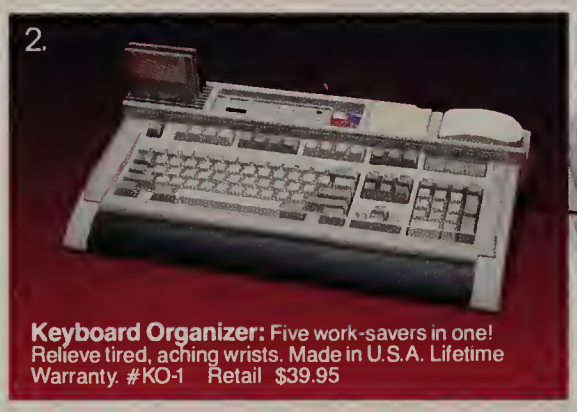

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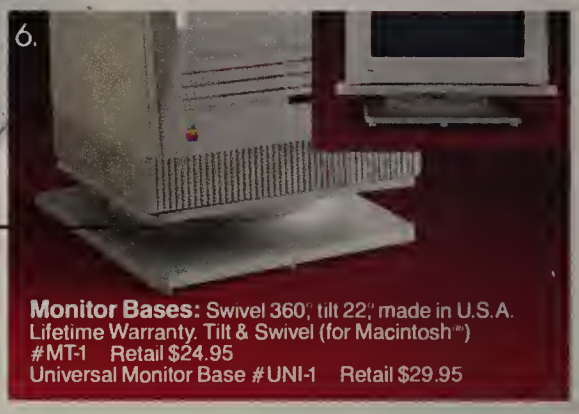

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What's Happening to Desktop Publishing

Part Two: Working with Photography and Prepress Color

BY JERRY BORRELL

Cooking instructions for using color in desktop publishing. 1. Obtain graphics file from a color scanner. (For this recipe use a 90MB file scanned on a Scitex system.) 2. Launch Adobe Photoshop in order to look at the file on screen. 3. Open the file (assuming you're lucky enough to have the file in a format Photoshop can read). 4. Buy a larger hard drive. (Photoshop keeps a "scratch copy" of the image you have opened, requiring that you have disk space available that equals the size of the original file.) 5. Wait 35 minutes for the file to open. 6. Convert the file from CMYK mode to RGB mode in order to see it in color (this operation requires another 50 minutes). 7. Once the file is in RGB format, move the on-screen image (wait 3 minutes for it to redraw). 8. Save the file as, say, a PICT file (wait 15 minutes). 9. Now you can begin work. Allow 50 minutes (or more) for Photoshop operations such as applying a filter to the image, or 25 minutes to compress the image with Radius's ImpressIt.

Warning! These instructions apply only to ideal situations and may prove more difficult in practice.

Luis Camus working with files that are shipped via ISDN to *Macworld Japan*. Ninety-megabyte files have presented some problems.

PHOTOGRAPHS BY DRAKE SOREY

How It All Got Started

A few months ago, assistant managing editor Luis Camus retrieved two test files from our color-separation house, Balzer/Shopes. One was a 90MB file produced by scanning a 4-by-5-inch transparency, which was enlarged to fill the first two pages of our March hard drive article. The other was a 7MB file of another image that ran with the same article.

I had eagerly installed ImpressIt on our international file server and was preparing to compress the 90MB file to a size that would be practical for Macworld Japan president David Ushijima to download in Tokyo via our ISDN link. It was Friday afternoon, the start of a pretty spring evening in San Francisco, and we had some new products to play with before taking off.

By 9 p.m. San Francisco time Luis and I were both calling our respective dates to explain that we had run into a few problems. So began our glorious venture into the world of four-color electronic publishing. I made a call to David in Tokyo and explained that we should wait a little longer before he tried downloading the image files for output on the kanji PostScript imagesetter in Tokyo.

How We Got This Far

This spring was an expectant time for us. Since May of 1989 *Macworld* has used desktop publishing technology. There is a bustle of behind-the-scenes activity required to put each issue of the magazine together. Every article is designed on the Macintosh, but type, illustrations, mechanical color, and

(continues)

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2

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Every La Cie drive includes a FREE copy of Silverlining, the #1-rated hard drive management utilities program.

Silverlining drivers can get 30% more speed from a drive than the competition. It works with any true SCSI drive, internal or external. So one program can manage it all. Plus, Silverlining optimizes your data so it's consecutive on your drive, which makes your applications run faster.

MacUser says, "Silverlining is one of the most powerful and useful hard disk utilities you can find—most Apple engineers prefer it to Apple's own."

And, Silverlining drivers are intelligent. They test the drives' functionality at startup to ensure that everything is working properly. If it's not, it protects you.

For even more protection, every La Cie drive includes a FREE copy of Norton Utilities® for the Macintosh. It automatically diagnoses, reports and repairs common and dangerous disk problems. Silverlining and Norton Utilities are regularly priced at $149 each. So, you get software worth almost $300—ABSOLUTELY FREE— when you buy a La Cie drive!

3

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La Cie is a Plus Development Company (makers of the Hardcard® XL), backed by $400 million in assets. That means you can trust La Cie to provide a constant source of high-quality mechanisms and components. And you can be certain that we'll be around to help you with service and support. For a long, long time.

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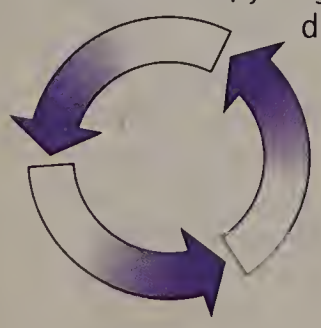
The Most Unusual Warranty in the Business.

La Cie features a RENEWABLE 2-YEAR LIMITED WARRANTY.† If anything goes wrong with your La Cie Quantum drive within two years, we'll repair or replace it within 48 hours—and then renew your warranty for another 2 years. Free of charge!



Every La Cie drive is backed by toll-free support from customer service and technical assistance experts.

†Restrictions apply. Please contact La Cie for complete warranty information.

5

Award-Winning Design.

Hard drives that win design awards? Who says intelligence has to be ugly? The Tsunami and Cirrus hard drives have received prestigious awards from both the industrial design and computer communities.

La Cie drives are designed from the inside out. Designed to be quiet (with a ½ speed fan), lightweight (as light as 2½ lbs.), durable and reliable. Plus, they have an external termination and SCSI address switch, which means you'll never have to open the case for any reason! You don't win awards for these features, but you do win a loyal following.

6

Rave Reviews from Critics and Customers.

Frankly, there's been a lot of talk about La Cie hard drives.

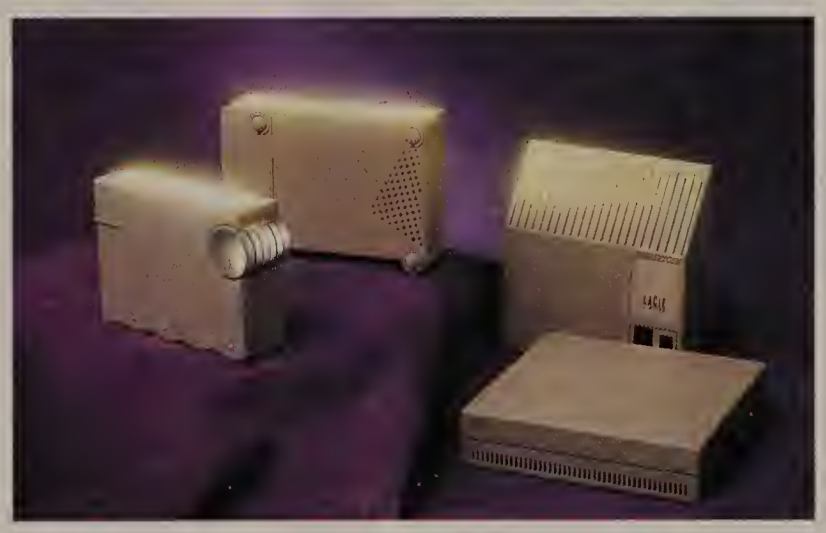
Leading Macintosh consumer magazines praise us. Customers write us fan letters. In fact, we're happy to let critics and customers have the last word about La Cie drives. Because they tend to be words like these:

★★★★★ —MacUser

"...the cream of the crop."—Macworld

"Of all the drives tested we recommend La Cie's drive."—MacUser

"This is an excellent drive and Silverlining is great!"—D. Jordan
Burbank, CA



La Cie offers internal and external hard drives from 40MB to 1.2 Gigabytes. Choose from the award-winning Tsunami, Cirrus, ZFP Family and Internal drives. Plus, La Cie now offers the Bacster, a hard drive that attaches directly to the back of a Macintosh Plus or SE.

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Sanjay Sakhuja (standing) and Eric Hudson of Digital Pre-Press International working with the Scitex SmartScan.

Leslie Barton of the *Macworld* design department placing 8-bit versions of scanned photographs in PageMaker.

four-color and continuous-tone image separations are produced by different service bureaus. These prepress processes are joined in a final step to produce the film that we send to Brown Printing, in Waseca, Minnesota.

In February we began to unite all these prepress processes and to produce film on an Agfa Compugraphics SelectSet 5000. We had several reasons to push ahead with our use of the technology. First, we support other *Macworld* magazines around the world, and those publications can take advantage of our digital page separations (see Part One, *Commentary,* in the June issue). Our ISDN and Switch 56 network capability offers more-reliable phone connections and higher transmission speeds than standard transmission lines do, making it practical to download large story files to these foreign publications.

We also hope to reduce costs, speed production, and simplify processes such as accounting, by reducing the number of suppliers with whom we have to work, and gain greater control over the entire production process.

Finally, we feel an obligation to use the technology that we write about, rather than merely recording our observations of others' work. It helps keep *Macworld* articles useful. So if prepress on the Macintosh was actually becoming practical, we felt it was time to take the plunge.

Talks with Our Suppliers

As you might imagine, magazine editors become jaundiced by talking with developers—all of whom say they are going to ship new products tomorrow. But as consumers of professional services from graphics arts suppliers, we demonstrated considerably more naïveté. When we began, we met with a multitude of prepress-service suppliers to discuss who would work with us on color publishing. When we asked for film output, the crowd thinned considerably.

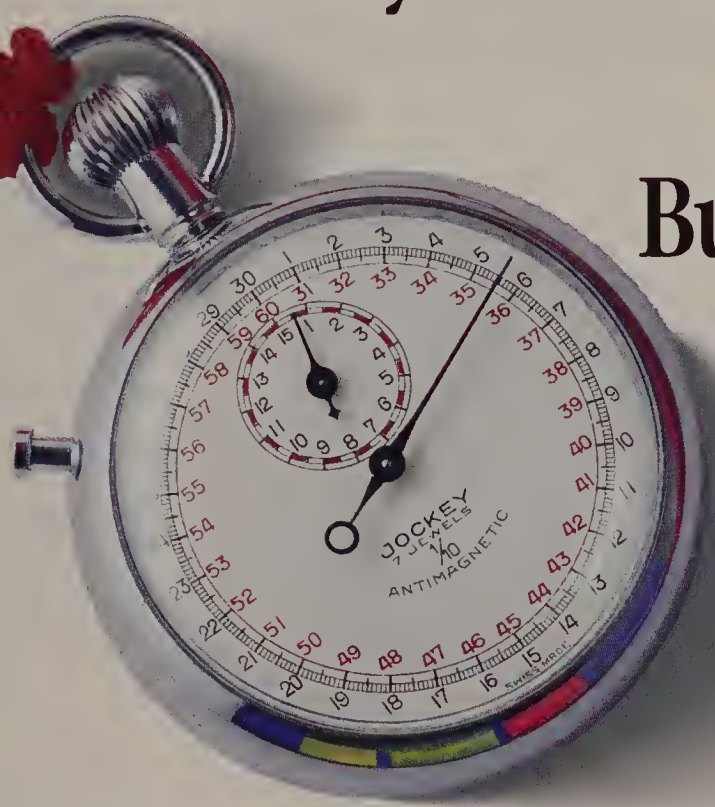
Since placement of continuous-tone (CT) scans was crucial, we had to select a partner who had the highest-quality scanning equipment available. One of our suppliers already had Crosfield and Scitex scanners. But as a large business, this supplier seemed less than attentive to our need to push the technology forward, and mainly interested in building a business that would serve the existing customer base and expand into a new market.

One of the contenders, Sanjay Sakhuja at Digital Pre-Press International (DPI), agreed to buy a high-end scanner that would match in quality the Agfa CG 9600 and Agfa CG SelectSet 5000 imagesetters that his company already owns. He also cooperated by adding a direct connection to our digital (ISDN) network, enabling us to transmit files and images between *Macworld* and DPI at 64,000-bits-per-second. This makes Sakhuja's computers appear on our network as if they were actually in our building.

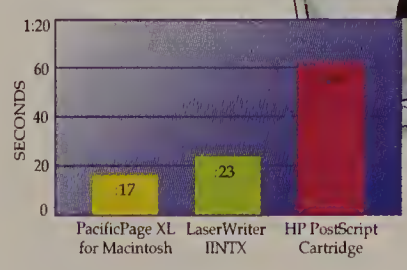
Sakhuja was uncertain whether to purchase a Scitex or a DaiNippon screen scanner; in the end he chose the Scitex SmartScan because it's faster to load with transparencies (since it uses a flatbed rather than a drum) and is semiconductor-based,

(continues)

PostScript solutions for LaserJet printers haven't exactly set records for speed.



But times have changed.



In the past, patience has been a necessity for getting PostScript® quality graphics and text on a LaserJet IIP, III, IIID, or IIIP laser printer.

Introducing PacificPage XL™ for Macintosh – it will change the way you look at PostScript emulation products, both in performance and price.

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PacificPage XL for Macintosh supports Adobe Type 1 and 3 outline fonts and utilizes the Resolution Enhancement feature of the LaserJet III printer family for the sharpest 300 dpi output available. And, PacificPage XL for Macintosh comes with a lifetime warranty and a money back guarantee of satisfaction.

If you're looking for a change of pace in PostScript solutions for the HP LaserJet III printers, call your nearest dealer or contact Pacific Data Products Inc., 9125 Rehco Road, San Diego, California 92121, U.S.A., **(619) 597-4651**, Fax (619) 552-0889.

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John Warnock (left) and John Knoll's development of Photoshop will determine whether that product will allow the Mac to support professional prepress color work.

and thus more easily updated as technology changes. With this device he can scan 35mm, 125mm, 3 by 4, 4 by 5, and 8 by 10 transparencies, as well as entire groups of transparencies on one plate. At its highest resolution, the scanner digitizes at 5000 lines per transparency—regardless of the transparency's size. This is where we obtain all of the information that makes up a color file (at 8 bits per pixel, on each of 3 scans for red, blue, and green; files are then processed into CMYK by the scanner's firmware). That amount of data is required to describe the color values in a transparency in order to print high-quality film for separations.

Once the transparencies are digitized, low-resolution versions of the original scans are available on our network for designers, such as *Macworld*'s Leslie Barton, who place the images as Desktop Color Separation (DCS) files in Aldus PageMaker for positioning, scaling, cropping, and other effects. Once the page design has been completed, the PageMaker file is transmitted to DPI, where Sakhuja's staff uses Aldus PrePrint to make color page separations. As Aldus PrePrint processes the separations, it automatically pulls in high-resolution image files stored on a file server at DPI to replace the low-res files denoted by DCS tags on the PageMaker page files. Sakhuja's staff then outputs the final color page separations on the Agfa SelectSet.

Who Does Color Retouching?

Until now, our color retouching work has been performed by only one of our suppliers, using a Scitex Assembly station at costs of up to $250 per hour. Many publishers and designers working with color want to avoid these costs.

The color-separation houses that have kept color publishing looking good over the years sense that the days of charging $250 per hour are nearly over. But not entirely, since those of us rushing to bring prepress technologies in-house often lack the skills and equipment in the near term to compete with the quality that service bureaus produce on high-end Scitex- and Crosfield-based systems.

We cannot compete in part because until recently, our artists and designers have not needed to be concerned with some aspects of their trade, such as the impact that manipulating 32-bit images on-screen has on the quality of film produced through analog devices. But they will probably develop the same facility in adapting to in-house prepress color work that they showed when we replaced traditional design and typography processes with Aldus PageMaker.

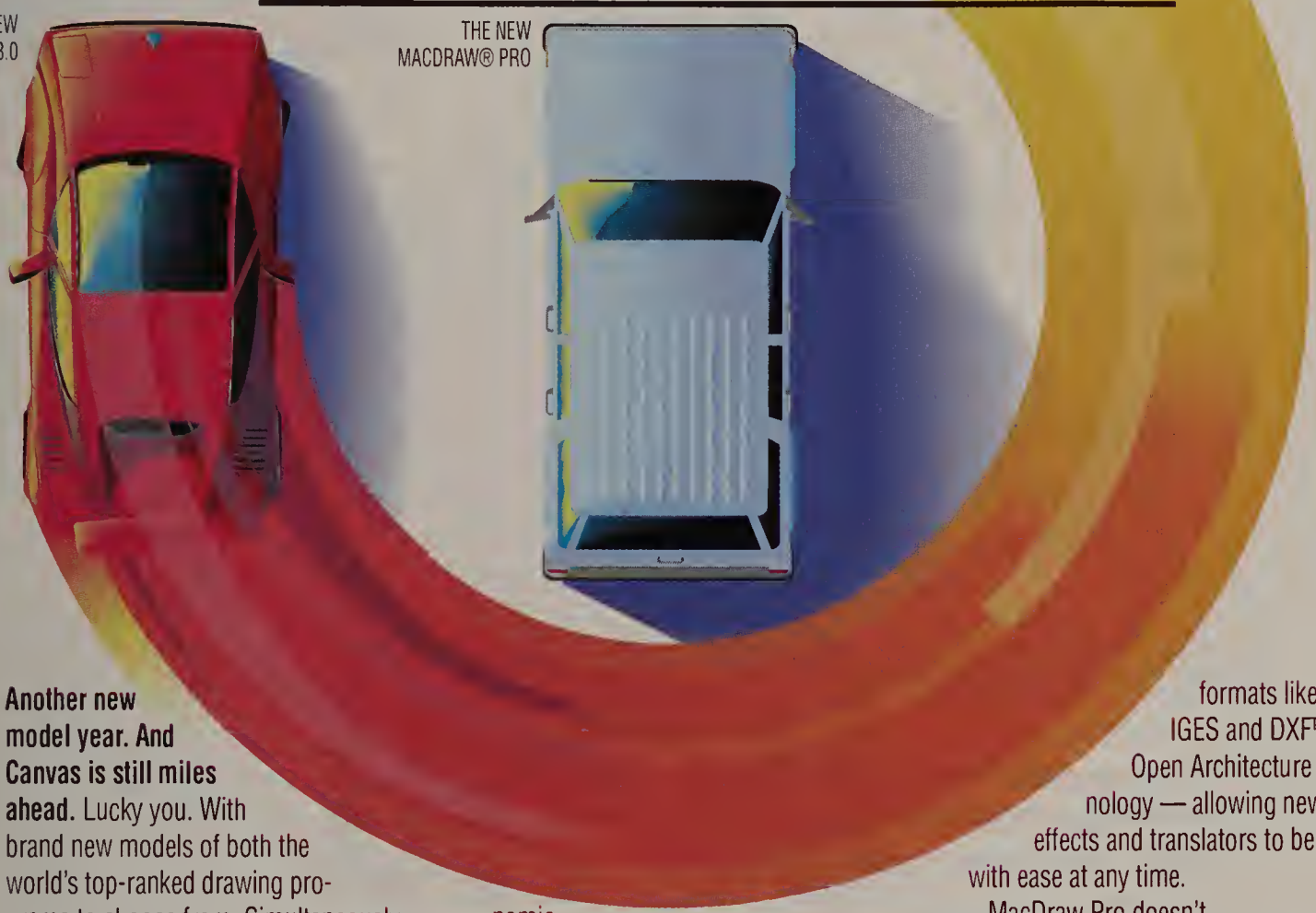
Not Ready for Prime Time

The real problems that slow down the process of bringing color prepress work in-house are the woeful inadequacies of today's hardware and software. When you watch a Mac take 30 minutes to open a file, you realize that Macintosh hardware and software are inadequate at present to the task of color prepress. But if we want to use the technology we'll have to suffer through the transition.

Problems first arise because of the size of the files. I'm using a Rodime Cobra 650 and a Storage Dimensions MacinStor 650 drive to open test files. Our image files generally run 7MB to 15MB in size, but full-page images can be as large as 45MB. When I try to open the 90MB two-page spread, Photoshop responds with a dialog box saying that there is insufficient disk space—an impossibility. I discovered that both drives, because of manufacturer formatting, may not allocate physical space large enough to store a single file as large as 90MB unless I reformat the drive. Then I can store

(continues)

SORRY, CLARIS. BUT IT'S DEJA VU ALL OVER AGAIN.



Another new model year. And Canvas is still miles ahead. Lucky you. With brand new models of both the world's top-ranked drawing programs to choose from. Simultaneously.

And MacDraw® Pro isn't a bad try. In fact, it reminds us of another drawing program we've always had the utmost respect for : Canvas 2.1.

Unfortunately for Claris, our new Canvas 3.0 includes enough major enhancements to leave their latest effort idling somewhere back in the dust. Again.

Let's take a look under the hoods. Canvas 3.0 gives you more high-end text handling features. Like binding to curves. Slanted margins. Text-wrapping outside — and/or inside — irregular objects, and full kerning & tracking control. Even conversion of PostScript® Type 1 fonts to customizable Bézier outlines.

MacDraw Pro doesn't.

Canvas 3.0 gives you more technical drawing features. Like custom dynamic hatching. Custom parallel lines & curves. Custom dashed lines, curves & borders. Automatic dimension lines. Area & perimeter calculations. And a Smart Mouse™ drawing aide.

MacDraw Pro doesn't.

Canvas 3.0 gives you more design/illustration features. Including unparalleled Bézier curve editing power--from multi-point selection & editing to automatic object conversion, combining and blending. Magnetic guidelines. Center line auto tracing of scanned images. And full bitmap editing in 24-bit color.

MacDraw Pro doesn't.

Canvas 3.0 also gives you new built-in translators for important multi-platform formats like CGM, IGES and DXF™. And Open Architecture technology — allowing new tools, effects and translators to be added with ease at any time.

MacDraw Pro doesn't.

You are what you drive. Like Canvas 2.1 before it, the new Canvas 3.0 was developed in direct response to the wish lists of thousands of drawing professionals. Its heritage of performance is proven. Its price is right. And its ease of use is legendary. Which leaves just one last question. If what you draw is important to you, why settle for Claris's sedate sedan when you can get your hands on a dream machine?

BUY VERSION 2.1 NOW AND SAVE!

Buy Canvas 2.1 between January 1, 1991 and August 31, 1991 and receive a free upgrade to Canvas 3.0!

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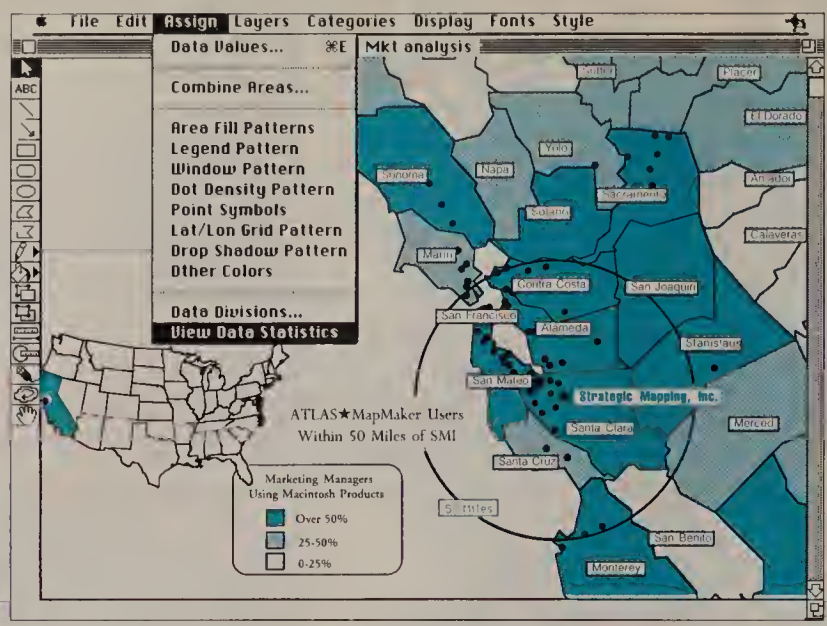

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MacUser 1/90

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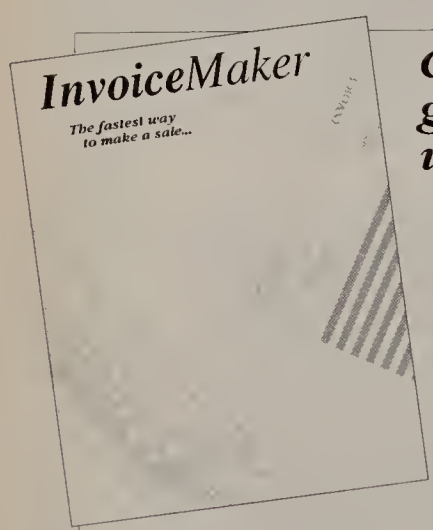

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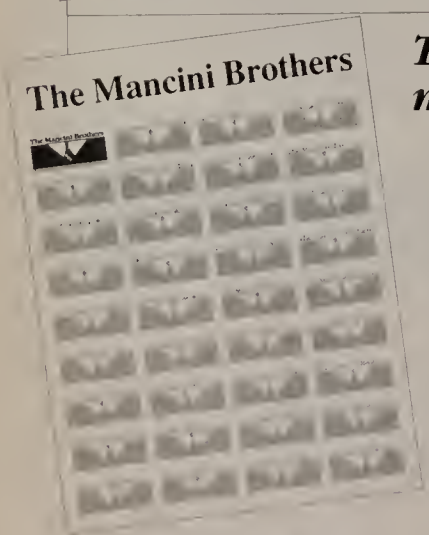

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Radius's Mike Boich (at the wheel) and Storm Technologies' Adriaan Ligtenberg—in a race to supply image-compression technology to professional publishers.

multiple large files on one drive.

The real hardware problem is the Mac: the 68030 chip's inadequate power for image processing (particularly since it does double-duty running the operating system); the inadequate technology for processing large blocks of data within the computer system; the inadequate technology for writing images out of memory and onto the screen. Thirty minutes for Photoshop to apply one filter to an image? This is simply not real-world. And those of us looking at accelerators that use the 68040 microprocessor—the microprocessor that will be the heart of Apple's new high-end Macintosh—do not believe that the 040 chip will solve these problems. Nor will simply adding 24-bit color to the system board of a next-generation computer.

If Apple and the Macintosh are to be players in the desktop publishing market's next evolutionary step, that of color prepress on the desktop, then Apple is going to have to reconsider the kind of computing horsepower that it supplies its customers.

Image Processing

In terms of software, we have been blessed in the Mac universe with Adobe Photoshop. This product is known to most of us as a universal can opener for images because we use it to open files saved in different formats, but it has some other uses. *Macworld* readers, for example, voted Photoshop their favorite for both color paint and image processing. It is in these two capacities that artists and designers are coming to depend upon Photo-

(continues)

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DITTO.

Even before the Macintosh Classic® & its new companions came along to wow the reviewers with heroic price/performance ratios, UltraPaint was keeping them plenty busy.

"As advertised, Deneba's UltraPaint...really does set new Macintosh graphics standards", wrote Ernest Mau of CompuServe.

"...many more B&W paint features than SuperPaint, almost all of PixelPaint's color tools, a superset of MacDraw II's object-oriented features, and the gray-scale prowess of Digital Darkroom. All this comes in a single program for less than half the price...", wrote David Pogue in MacWorld.

Perhaps Chris Prior of MacUser UK summed it up best when he wrote that "UltraPaint...could prove to be the ideal software package for those looking for a powerful, all-around draw and paint program."

And it's true. UltraPaint really does offer you the same sophisticated graphics processing power of several leading programs combined — all in one inexpensive, easy-to-use package.

Open it up on one of Apple's new low-cost machines and we're talking a match made in heaven. Particularly if you've always pictured heaven as a place where you get big muscles without having to pay the price.

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Purchase UltraPaint and a Macintosh Classic, LC, or IIsi between October 15, 1990 and May 31, 1991, and receive a $25.00 rebate direct from Deneba. Simply send a copy of your qualifying Mac registration card, your original UltraPaint registration card, and dated proof of purchase for both to our main address.We'll send a check for $25 US by return mail!

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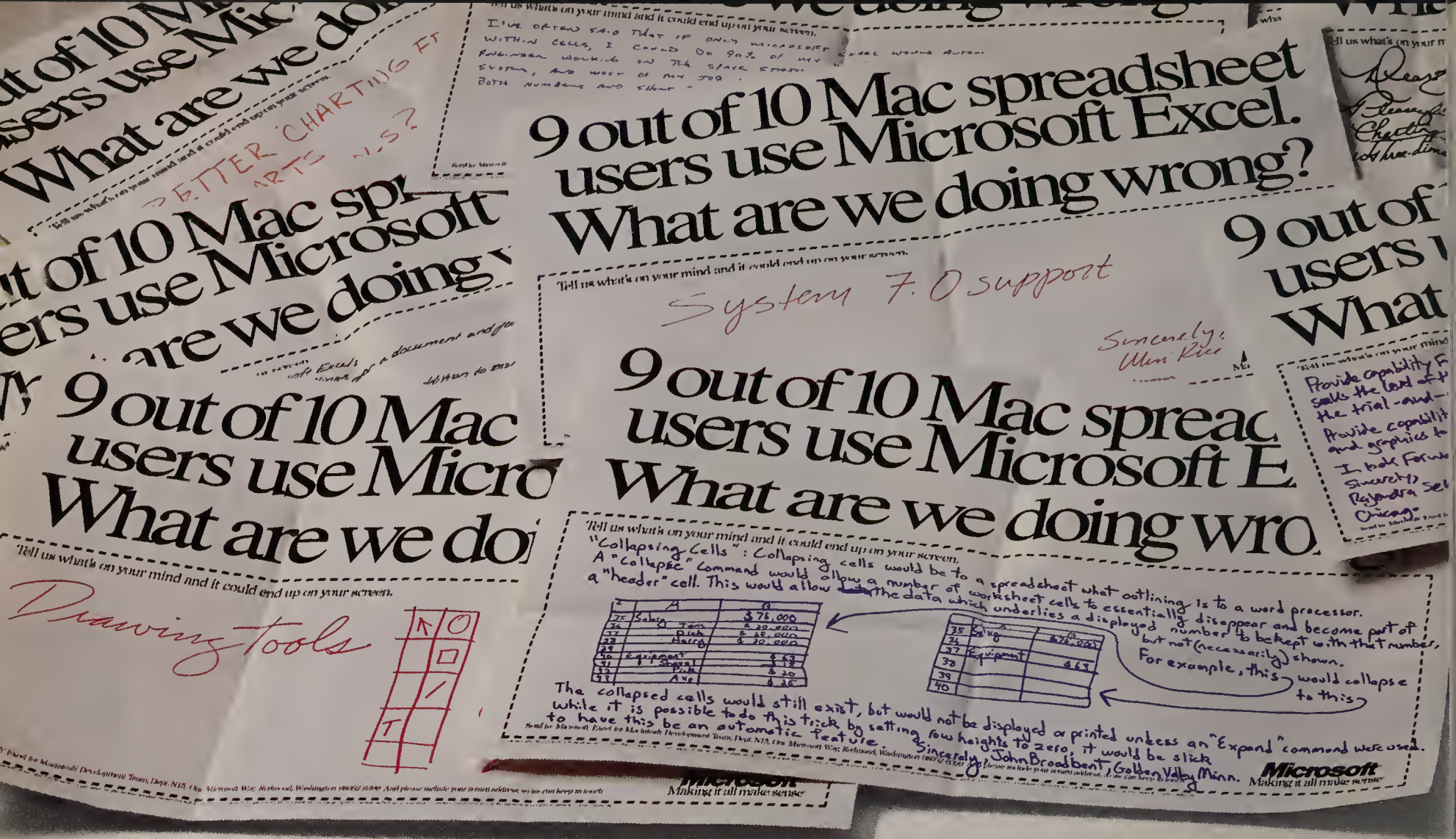


New Microsoft Excel of an exhaustive cor

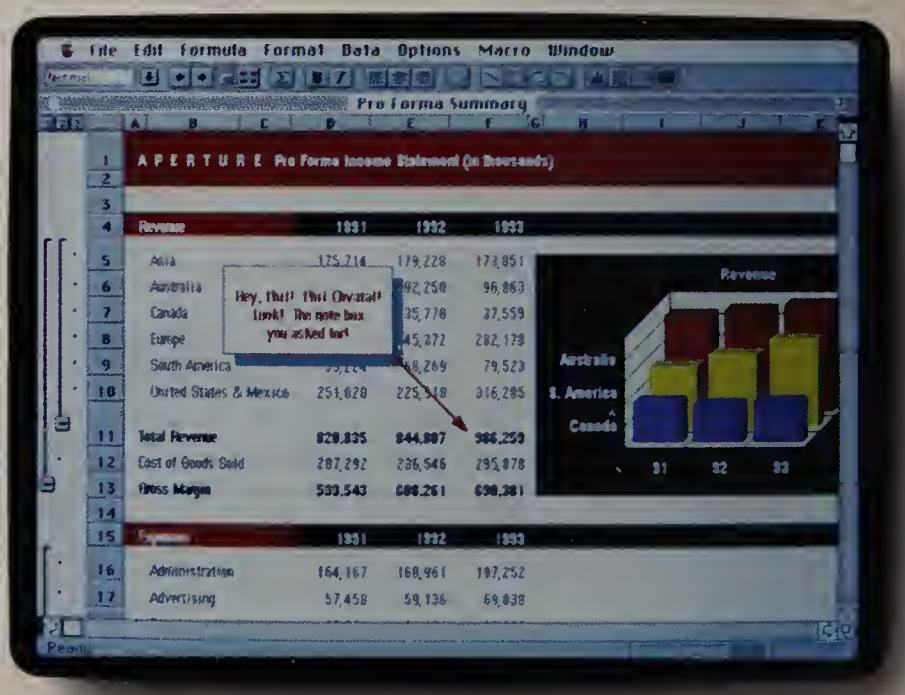
Betsy Mill put it all in perspective when she wrote to us, "I love [Microsoft] Excel as much as my microwave oven but no love is perfect."

Well, Betsy, get a load of this. We think new Microsoft® Excel version 3.0 is the closest thing to perfection ever seen in a spreadsheet for the Mac.® For one good reason.

Power made easy.

The new Toolbar,™ for instance, reduces common, time-consuming tasks down to one step.

Highlight a row or column of numbers, hit the Σ button (that's Autosum™),



Yes, Paul, a single button now lets you access 68 chart types, 24 of which are 3-D. You can incorporate these right into your worksheet, along with text and data. And notice the outlining feature on the left? Go nuts.

and *voilà* – it all adds up.

Do quick, push-button formatting.

Use outlining features to collapse

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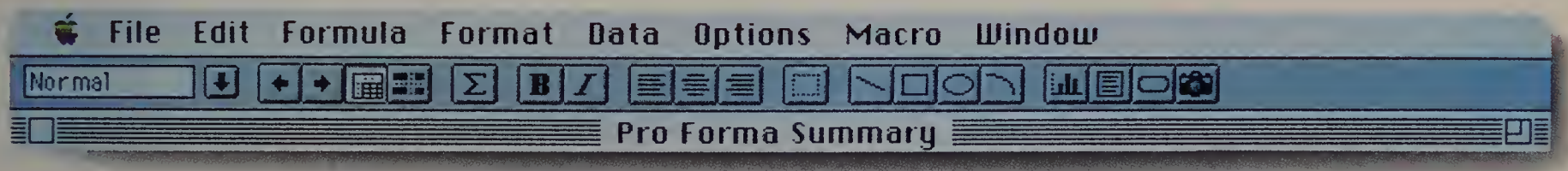

Take a look at the new Toolbar. In one step, you can now access style sheets, outlining features, Autosum, formatting options, drawing tools, charts of all kinds and macros. Go to town.

or expand worksheets without having to create multiple files.

As for charting, we took our cue from Paul Woods, who began his letter with the salutation, "Charts, charts, charts!" Hey, Paul – check out the picture and caption for the full scoop.

Did we mention that you can consolidate up to 255 worksheets at a time, regardless of format?

Or the Goal Seek feature, which lets you put in the total you want and works backwards from there to fill in the variable you need?

Or the fact that this is the first System 7.0 application available?

Plus, you can update to version 3.0 for $129. If you acquired your current version of Microsoft Excel on or after 12/7/90, the upgrade is only $50*. Call (800) 541-1261, Department Q83, to find out more.

By the way, Bryan Larson: we said hi to Bill for you. He sends his regards.

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THINK TWICE BEFORE YOU SWITCH TO . . 7 . .

Think backup. And once you switch, think backup again.

You need Retrospect, a backup program that won an Eddy under System 6 and carries on the tradition into System 7. Retrospect is as familiar with Aliases and the Extensions folder as it is with tape drives and SyQuest cartridges. And to backup networked Macintoshes to one storage device, there's Retrospect Remote.

RETROSPECT & RETROSPECT REMOTE

To Go Forward You Must Backup

Dantz

DANTZ DEVELOPMENT CORPORATION

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shop. But the program needs to evolve in two ways if it is to serve the professional prepress market: first, it must manipulate real-world image files more quickly; and second, the range of its already considerable software effects must be expanded to rival those available through Scitex or Crosfield workstations.

Several smaller improvements are needed as well: Photoshop should compress image files directly; you should be able to open files in a given format (like RGB) without having to first open the file in another format; PostScript 2 code implementation is a must. Such changes will be up to Adobe and the developers of the product, John and Tom Knoll.

In the near term we plan to make Photoshop on a Macintosh compete with a Scitex system by throwing hardware at the problem. Sanjay Sakhuja, for example, has 32MB of RAM on the Mac IIci that he uses for color retouching at DPI, and he plans to upgrade to 128MB.

Image Compression Is Crucial

Given the size of the files that I'm writing about, compression is vital. We have to store a year's worth of images for use by our sister *Macworlds*. We'll eventually build up a collection of multigigabyte drives, but they're expensive. And at up to a gigabyte of storage for each issue of the magazine, we'll never be able to afford storing images at full size.

Compression is important for other reasons as well. We want to transmit images across our ISDN network, which is too slow even at 64,000 bits per second and runs out of capacity quickly. Storm Technologies' Adriaan Ligtenberg and Radius's Mike Boich have been sensitive to our initial input on these products, and changes are under way in their compression products.

Looking Ahead

Last year I suggested that 1991 would be the year of color in publishing. I still believe that, but it's going to take until the end of the year before we get all the bugs worked out and are producing all our photography on the Mac. And, of course, just a little more equipment. ■

Mirror's Color Monitors Give You More Mice at Half the Price.

We thought the Mirror Trinitron® was a real bargain.
MacUser May 91

Radius 19" 24 bit color
$7890 🐀🐀🐀🐀

Mirror 19" 24 bit color
$3997 🐀🐀🐀🐀 1/2

Radius has always made an excellent big screen color monitor. But according to a recent MacUser magazine article, Mirror makes a better one. In fact, in one of the biggest reviews yet on the color display category, MacUser gave Mirror 4.5 Mice and said "its 19" Trinitron® System was a razor-sharp standout and had excellent software".

Mirror has been manufacturing Macintosh peripherals since 1985 and quality has always been a tradition. And it continues with our 8-bit and 24-bit color monitors which feature a Trinitron® tube and other extras such as an anti-glare screen and our exclusive DeskTop Designer™ software featuring pop-up menus and a handy screen saver. And we back all our monitors with a one year warranty, unlimited free technical support, and a 30 day money back guarantee.

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MIRROR

At $2897
Mirror's 19" 8-bit color monitor just might be the best value in color systems.

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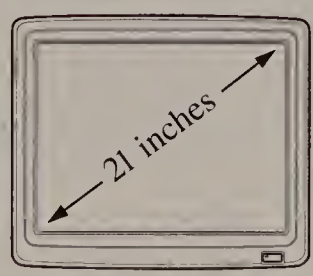

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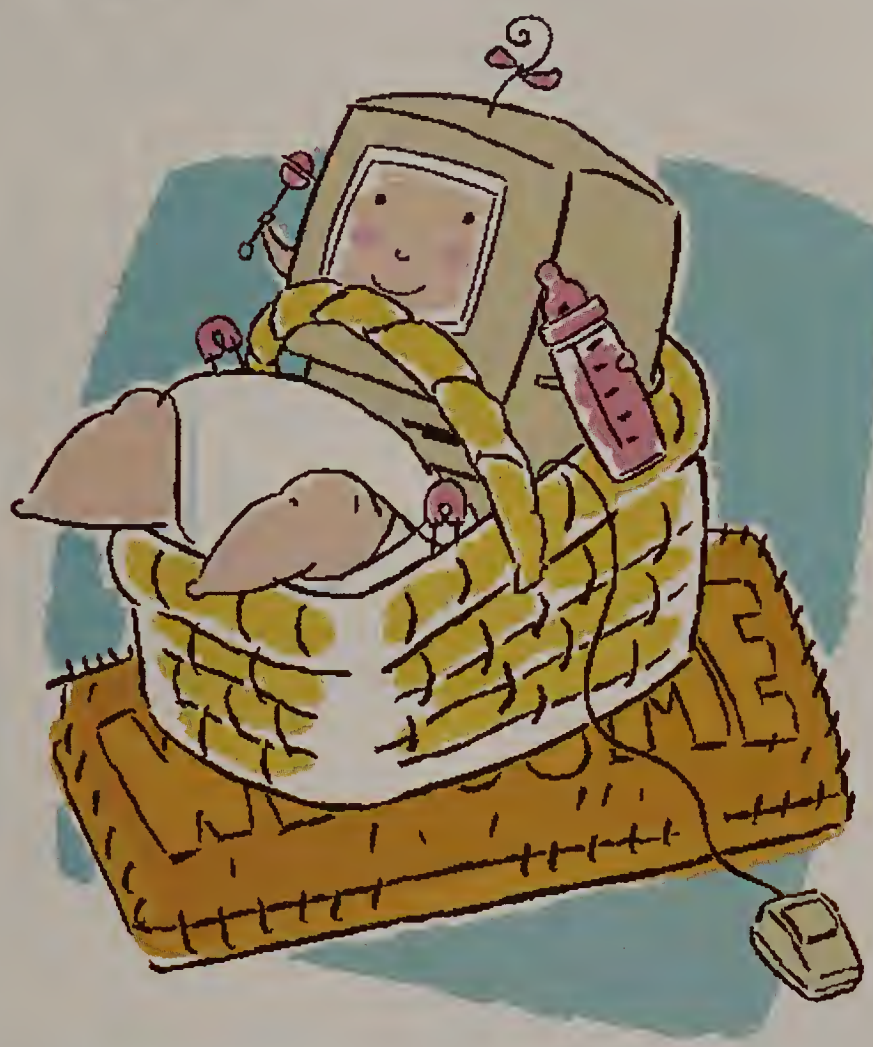
LETTERS



WARD SCHUMAKER

End of the Macintosh

Won't it be great when Apple finds its Macintosh monopoly and market share and technological lead disappear at the hands of all those NuTek machines ["Send In the Clones," April 1991]? Won't it be great when Apple loses its peripheral business? Or loses its dealer network at the hands of the mail-order shops? Hey, who cares? Apple can always fall back on its mainframe business like IBM did. What? Apple doesn't have a mainframe business? Too bad.

I guess I have to go with the clone article as my favorite. After all, I made a conscious decision to go Mac rather than IBM, and if I end up with an orphan machine I have no one to blame but myself.

Paul Galanti
Indianapolis, Indiana

The Atari That Would Be Mac

In your discussion of Mac clones and emulators currently in production, I was disappointed that you failed to mention the Spectre GCR cartridge, which transforms an Atari ST computer into a (faster) Mac Plus. The Spectre GCR (minus the 128K Mac Plus ROMs) retails for $299.95 from Gadgets by Small, Inc., 40 W. Littleton Blvd., #210-211, Littleton, CO 80120.

Forrest Blood
Delran, New Jersey

Develop, Don't Litigate

What a waste! If NuTek spent those zillions on developing the next generation of personal computers instead of meticulously cloning the Mac and preparing to do battle in the courts, the consumer would be light-years ahead. Apple is equally to blame.

Michael W. Miller
Middleton, Wisconsin

AutoMac's Unlauded Advantages

Yes, you can assign the F-keys to your [AutoMac III] macros ["The Desk Potato's Guide to Macros," April 1991], although you can't just press F8 and start recording a macro to empty the Trash or print, as you can with other macros. You can still use them by simply typing "F8" in the Record dialog box. AutoMac will then ask you to press the F8 key to define its position on the keyboard, then just record away. You can use all 12 F-keys and also the escape key this way.

Where you got the figure 20 for the number of times AutoMac can loop, I don't know. I set up a macro before I leave for the night and it's still running in the morning.

I was also disappointed that you did not mention the editing feature in AutoMac, which has been a real time-saver more than once.

Paul Reznick
Troy, Michigan

Thanks for pointing out the undocumented feature. In our tests, AutoMac's recursive macros loop only about 20 times. In related news, CE Software has released an Extensions set for QuicKeys². One of them pastes any text or graphic at a keystroke; another permits controlled looping; and still another switches your monitor between various color settings.

Paper Chase Redux

You guys were way too easy on that apparent environmental nut who complained in a letter to the editor in your April issue that you are using 1485 metric tons of paper per month to include subscription forms in *Macworld*. That figure is incredible because it is grossly wrong. My calculation gives something like 3 tons. Even her calculation of 809.4 times 340,000 was off by more than a factor of 10. Your

(continues)

Corrections

*The upgrade price [*Updates, *April 1991] for Falcon from Spectrum HoloByte is $5.*

Ehman lowered the price of the Swift 165 hard drive as "Midrange Hard Drives, Just Right" [March 1991] was going to press. The $849 price is reflected in the table but not in the text.

*The TokaMac LC accelerator (*MacBulletin, *April 1991) is available from Fusion Data Systems, 512/338-5326.*

typist should have caught that. Why are people so gullible about ridiculous environmental claims? Anyone who didn't instantly recognize how preposterous the numbers in that letter were would probably also believe, say, that monitor emissions are harmful.
Bill Mixon
Austin, Texas

In fact, we use 10 tons of paper per issue for the subscription cards and the reader service cards combined. Also, the National Academy of Sciences is currently studying electromagnetic emissions.

Biodegradable Reviews

How about printing *Macworld* on quality recycled stock? *Garbage* magazine does it and it looks great. If you're serious about the environment, drop the posturing and do something constructive!
Gary Young
Albany, California

We are exploring with our printer the use of recycled paper and soy-based inks. Currently, there are no acceptable solutions, but we are in constant contact with our printer about the latest technological breakthroughs and how soon we might be able to utilize them. We currently use recycled paper for all our marketing pieces and are testing the use of recycled paper for our inserts and subscription and renewal cards.

Pros of Prodigy

Prodigy has yet to have a fair review in your magazine. Essentially, Prodigy gives you unlimited time on the service for $10 a month. Some few percent of its membership were using this fact to send over 1000 pages of mail a month. Prodigy could do it only if other members subsidized the heavy E-mail users.

The question of censorship is two-sided. Because of children, Prodigy needs more supervision of its bulletin boards and public clubs than the other services.
Calvin S. McLaughlin
Corona del Mar, California

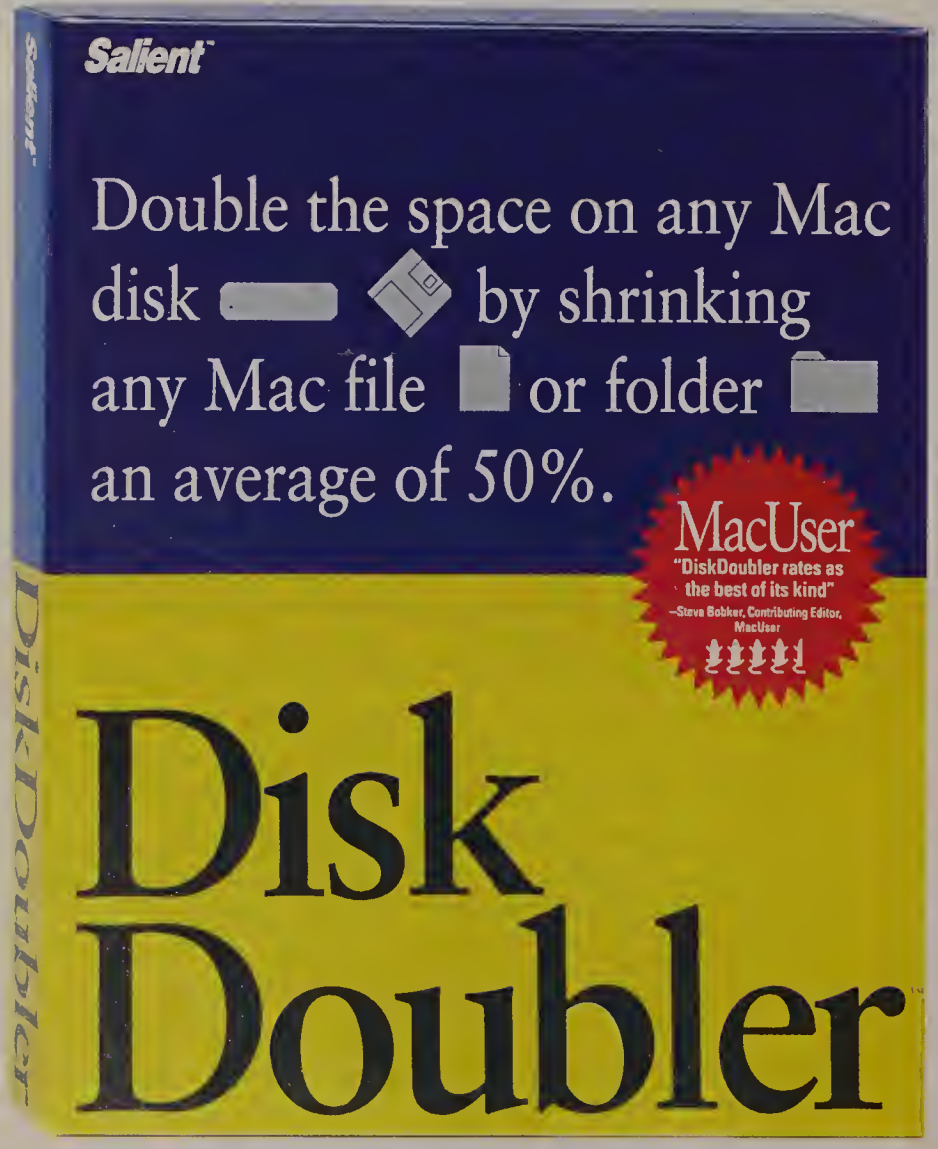
Don't Censor Stupidity

I find it amazing that one of the examples cited by Brian Ek of Prodigy [*Letters*, April 1991] is their censoring of the comment, "You can't get pregnant if you don't have an orgasm." So now they are censoring stupidity as well? As an educator, I find this disturbing. The best way to combat such stupidity is to bring such comments to the fore and let the light of public scrutiny set such people straight. Learning and truth thrive when there is a free and open exchange of ideas.
Allen Shoemaker
Grand Rapids, Michigan

Keyboarding with UltraKey

Unfortunately, Larry Stevens's comments [*Window Shopping*, March 1991] are uninformed about the purpose of a keyboarding tutor. Most keyboarding tutors do little more than provide drill and practice. UltraKey shows people how to type correctly. In each

(continues)



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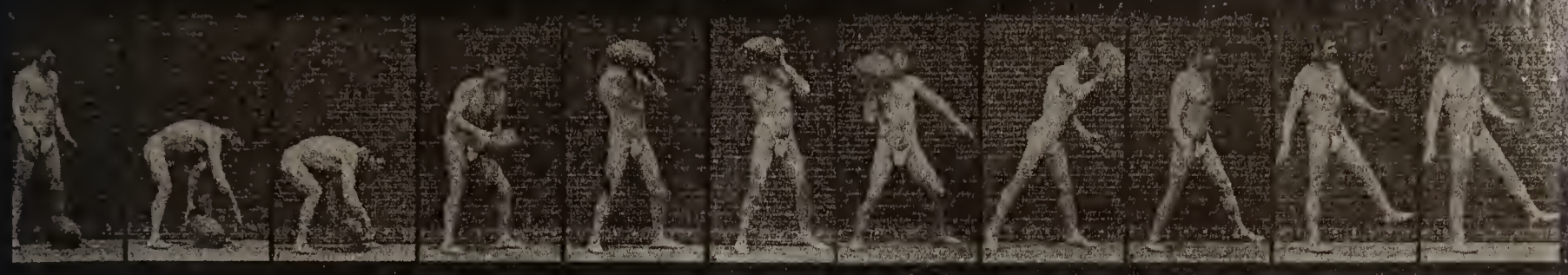

Man Heaving 75-lb. Boulder. Woman Emptying Bucket of Water on Seated Companion. Man Balancing on One Foot. A ballet for eccentric acrobats? Yes, but at the time, also the world's most ambitious photographic research project. Refining the techniques he developed taking pictures of Leland Stanford's race horses in California, Eadweard Muybridge produced 100,000 negatives in the span of a year and a half.

On a good day, he would take five or six hundred 4 x 5 pictures. — In your own quest for fresh insight, which type for the Macintosh® will be your most faithful servant? Perhaps it will be type from the foundry that spares nothing when it comes to capturing the original. Bitstream, where the spirit of type burns brightly. Where the kerning is exquisite. Where people go to outrageous lengths to preserve the integrity of a type designer's dream. Where our library of over 1,000 faces is growing all the time. Call to order or ask for a complete showing of PostScript® compatible fonts. Bitstream. Labor of love.

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3 **NewsEdit/Wire Manager/ Baseview Editorial** let you collect, edit, and paste wire service data.
Baseview Products

4 **QSpool** adds high-speed document spooling.
Baseview Products

5 **TranTags and CommLink/Plus** import text and replace old code with Quark XPress style tags.
Baseview Products

6 **ColorSnap32+XT** imports single images from video or still video cameras.
Computer Friends, Inc.

7 **BureauExpress** automatically transmits QuarkXPress files to service bureaus.
Compumation, Inc.

8 **Palos** adds workgroup publishing capabilities.
DKA Inc.

9 **Xdata** automates database publishing.
Em Software, Inc.

10 **Xstyle** provides palettes for paragraph/character settings and style sheets.
Em Software, Inc.

11 **ProPublisher** adds keystroke-activated features that use extended keyboards.
EPIC Publishing Solutions

12 **Grid Layout** creates uniform snap-to grids.
J. Michael Marriner

13 **Atan EXPRESS** processes and paginates ATEX markup files in QuarkXPress.
John Juliano Computer Services Company

14 **TMS EXPRESS** processes and paginates TMS/EMS markup files in QuarkXPress.
John Juliano Computer Services Company

15 **Autopage** paginates and controls page layout of long documents.
K. Erf Associates

16 **Grids & Guides** creates precise page grids and guides.
Liberty Engraving Co.

17 **Default Settings** lets you customize many graphic interface elements.
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18 **Page Director** lets you manage all page elements from assignment to composition.
Managing Editor Software Systems, Inc.

19 **Mycro-Comp PAGE** streamlines production of editorial and classified-ad pages.
Mycro-Tek, Inc.

20 **CopyBridge** links XyWrite to QuarkXPress for precise copyfitting.
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21 **CopyFlow** automates placement of text and graphics into layouts.
North Atlantic Publishing Systems, Inc.

22 **CopyFlow Reports** generates layout diagrams and document status reports.
North Atlantic Publishing Systems, Inc.

23 **Overset** creates temporary text boxes for viewing overflow text.
North Atlantic Publishing Systems, Inc.

24 **SpectreScan QX** lets you scan color, grayscale, and B&W images from within QuarkXPress.
Pre-Press Technologies, Inc.

25 **SpectreSeps QX** lets you make color separations of QuarkXPress documents.
Pre-Press Technologies, Inc.

26 **Flexo Step & Repeat** outputs step-and-repeat files to Label, Tag, or Flexo printers.
Professional PrePress

27 **DataLock XTension** prevents users from changing certain QuarkXPress attributes.
PTN XTension

28 **The Puzzler** lets you define patterns and numbering for crossword puzzles.
PTN XTension

29 **Wang WP/PC XTension** imports Wang text files directly into QuarkXPress documents.
PTN XTension

30 **WordPerfect DOS XTension** imports WordPerfect files directly into QuarkXPress documents.
PTN XTension

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31 **QuarkFreebies** adds seven features and network communication to QuarkXPress.
Quark, Inc.

32 **QuarkXTras** adds seven special design and production tools to QuarkXPress.
Quark, Inc.

33 **SCS/LinX 3.1** imports Layout-8000™ geometries to paginate full newspaper pages.
Software Consulting Services

34 **NewsLink** flows text from Synaptic's SunType Editorial System into QuarkXPress documents.
Synaptic Micro Solutions

35 **Sonar Bookends** generates indexes and tables of contents.
Virginia Systems, Inc.

36 **Sonar Professional** provides high-speed text retrieval, text analysis, and indexing.
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lesson, keys are introduced by demonstrating the keystroke and letting the user respond.

The review's largest oversight is the failure to mention the skill-check component of UltraKey, which treats users to a unique, new experience. UltraKey is the only keyboarding tutor that tests your skill by letting you freely type just as if you were word processing. It then analyzes your work, looking for strategic problems—the kinds of problems that result from poor posture and incorrect hand position. When you use UltraKey, it's like having a private teacher.

We know that UltraKey costs more, but in our opinion, a $79 list price is what it takes to provide customers with a keyboarding tutor that really works. If, after using UltraKey in the recommended manner, any customer is not satisfied that UltraKey is worth every penny paid, then Bytes of Learning will refund that customer's money.

Art Willer
President, Bytes of Learning
Willowdale, Ontario, Canada

Bad Call to Bottom Line

I was looking for a printer for my Mac, and on page 323 of your February issue I saw an ad from Bottom Line Distribution that quoted a price significantly lower than any other I'd seen. The ad also gave a 900 phone number, and said it would cost me $2 per minute to call. That made me a bit nervous, but I figured even with a few bucks for the call the price would still be lower than anywhere else. So I made the call, and was told the item was "out of stock."

Now I get my phone bill and find it cost me $4 to learn this. So how come this company has a 900 phone number? Generally, the point of a 900 number is that what the caller is buying is the content of the call itself—as in the 900 numbers on late-night TV ads featuring sultry girls in filmy negligees. In this case, Bottom Line's quoted prices are pretty sexy, to be sure, but the final product delivered is what used to be called a tease. Big talk, no action.

Macworld made money on the ad; I got taken. I'm disappointed in you guys.

Andrew Main
Santa Fe, New Mexico

Bottom Line Responds

We use our 900 number as a tool to help lower our overhead. The majority of our customers realize that the phone charges are small in comparison to the amount of money they save, as well as the service and technical support that Bottom Line provides.

It is an unfortunate reality that items are sometimes out of stock. However, as we do stock over $160 million worth of inventory, if anyone has it, chances are it is us. If you had requested that we do so, your order could have

(continues)

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MacWeek 3/26/91

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Paula Monat
Director, Customer Service
Bottom Line Distribution
Austin, Texas

Dangerous Surge Protection

I enjoy reading *Quick Tips* by Mr. Poole, but when I read the answer to the "Surge Suppression" question in your March 1991 issue, I found that for the second month in succession the subject of supplying AC power to computers did not address the potential hazards of conventional spike/surge protectors. MOV devices deteriorate with age and minor surges, and both MOV and diode protection technology are apt to damage communications equipment while attempting to protect computers by diverting high voltage to ground. The trend to network computers has made this more than just a problem for modems.

Dave Lueders
Bethesda, Maryland

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And while we have been busy reinventing your Macintosh, the best software developers in the world have been busy, too. Creating the next generation of Macintosh software. Bringing new powers to your favorite Macintosh applications. And creating new programs that will enable your Macintosh to do things no other personal computer has ever done before.

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Since 1985, Microsoft's **Excel** has been the standard-setting spreadsheet complete with high-performance charting, database, and custom development tools. In fact, it's been the choice of nine out of ten Mac spreadsheet users. And with Version 3.0 it's even easier to use, thanks to the new Toolbar, which lets you perform charting, formatting, and analytical functions *in a single step*. For example, instead of executing several keystrokes or clicks to sum a row or column of numbers, just click Autosum. Other single clicks let you format worksheets, create charts, apply styles, run macros, and do much more.

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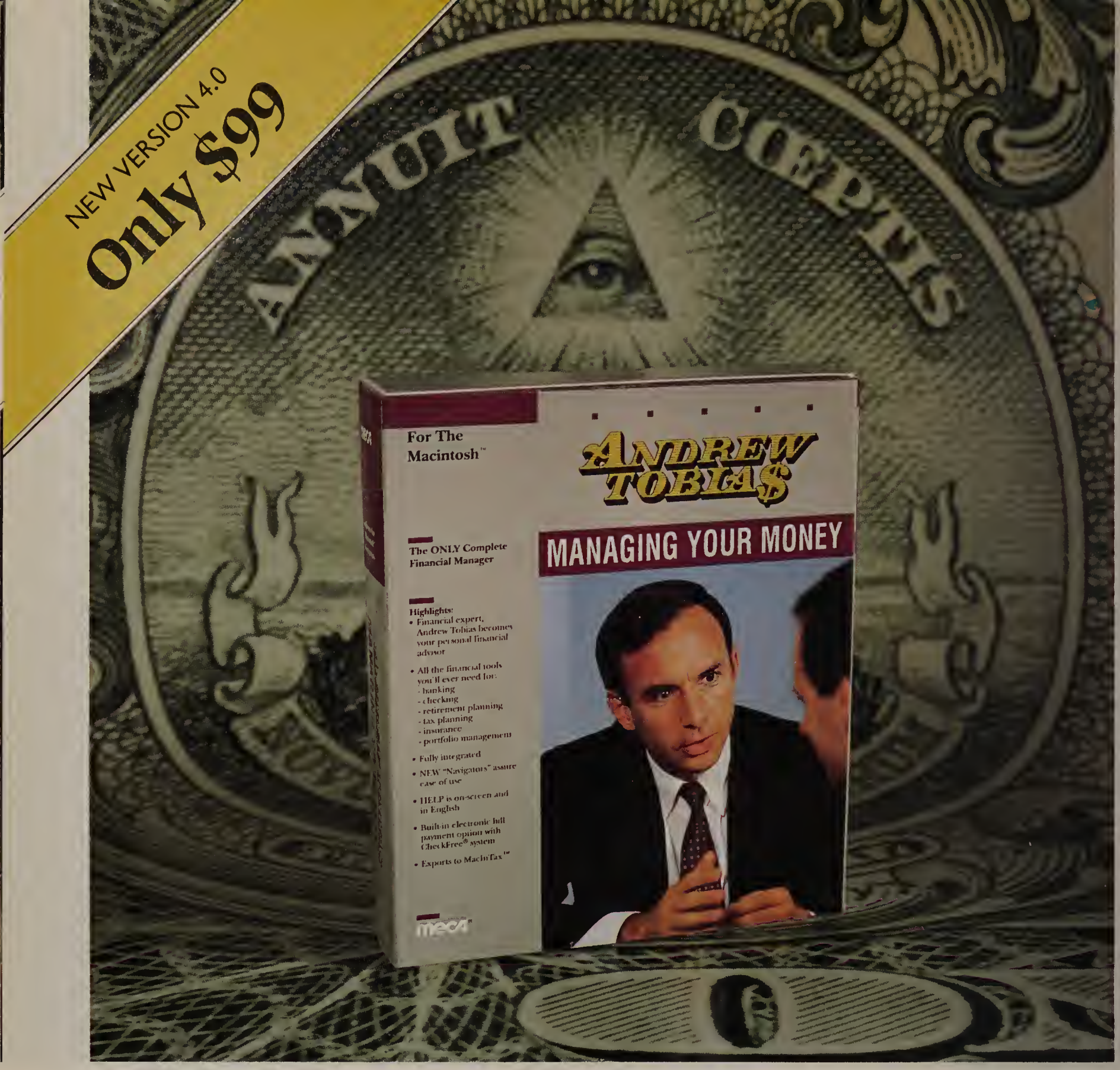

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Total control of finances.

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Advanced Software ... 30 day MBG

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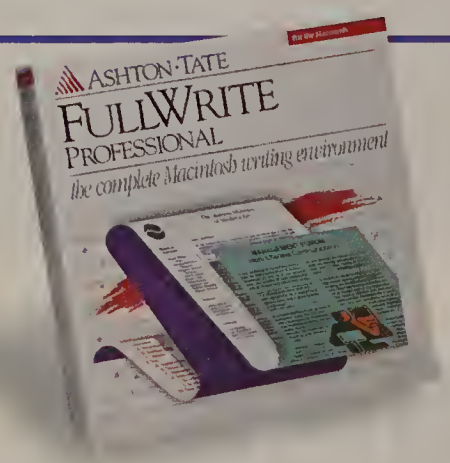

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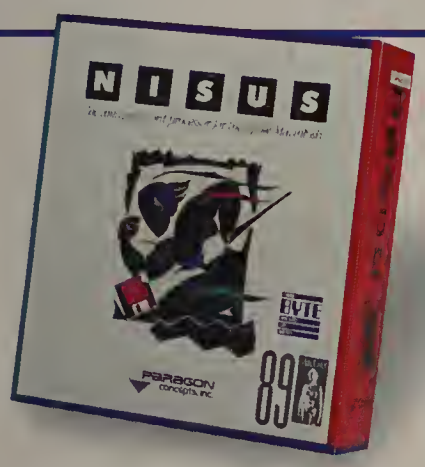

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7587 Adobe Type Set 3 . . . . . 125.
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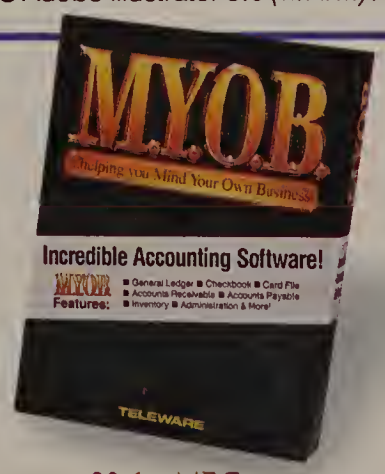

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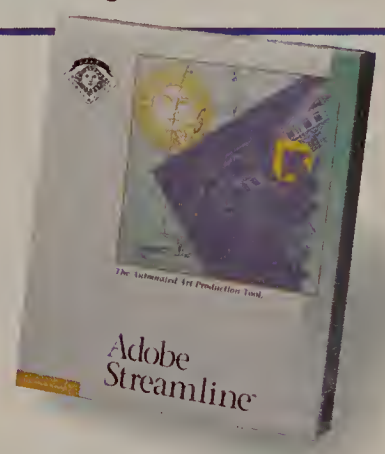

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6278 DiskTop 4.0. . . . . 63.
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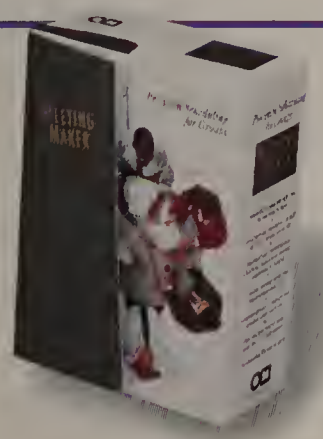

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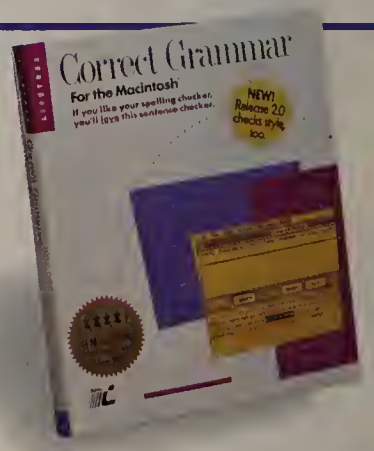

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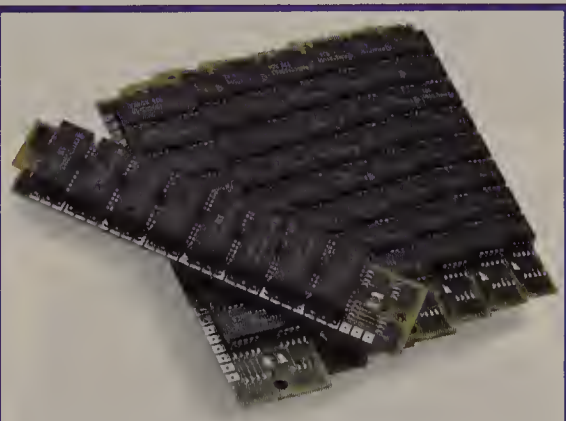

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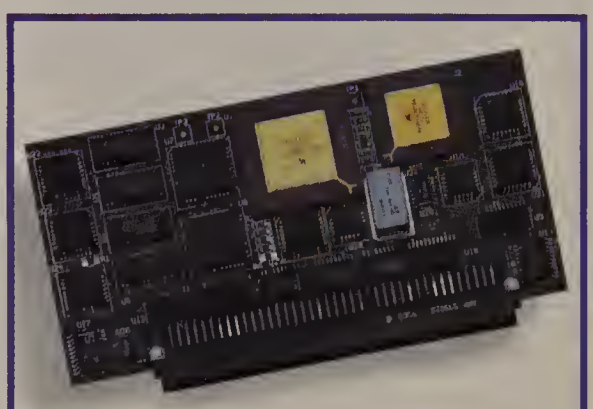

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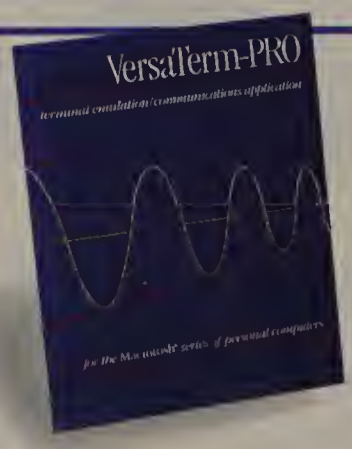

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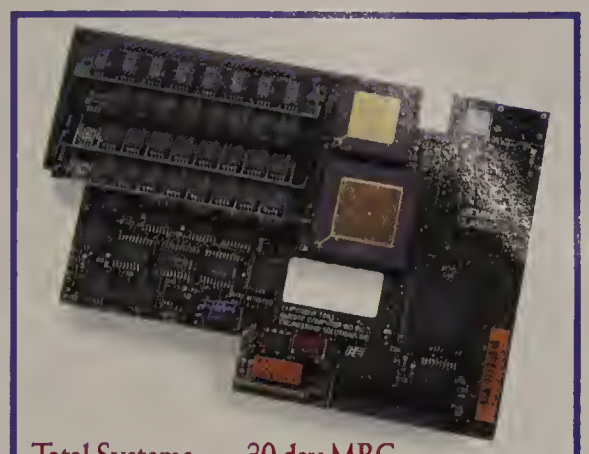

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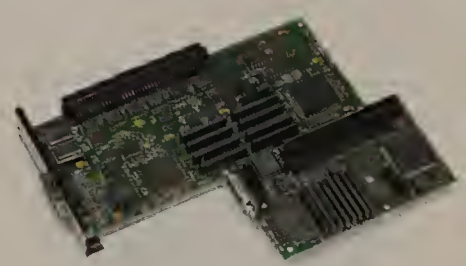

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ART BEAT

by Cathy Abes

The tools and the talent behind Macworld's graphics and the techniques that make them possible

The final illustration, which opens the *Conspicuous Consumer* column on page 141.

Artist: Peter Alsberg, who lives in Washington, D.C., works as an illustrator for the *Washington Post* and also does free-lance illustration. Since he began exploring the Mac's graphic possibilities three years ago, Alsberg has successfully adapted his brush-and-ink drawing style to work with the Mac and to make better use of FreeHand—his program of choice—with its line- and curve-drawing capabilities.
Tools: Mac IIcx with 5MB of RAM and an internal 100MB hard drive; Microtek MSF-300Z color scanner; Aldus FreeHand 2.02.
How It Was Done: Alsberg's intention was to give this illustration—which opens the *Conspicuous Consumer* column—a loose feel, to make it look less like a computer-generated drawing. This meant creating lines that didn't necessarily connect and colors that often extended beyond an object's boundaries.

He started out with a very dark, soft-pencil line drawing, which he photocopied to make the lines darker and denser. Then he scanned it into FreeHand as a TIFF file. After sending it to FreeHand's background layer (layer 0), he made the background layer inactive so he could use the image as a template; this enabled him to trace over it without worrying about accidentally moving it.

Alsberg specified the top layer (200) for all his line work (by choosing Layer Control under the View menu) so that none of the lines would get hidden behind color fills. Having the lines on the top layer also let him change the line weights without affecting anything else in the drawing.

"I try to organize my drawing so I'm drawing things on top of each other in sequence—either by drawing each new object on a higher layer or by sending existing objects to a lower layer," he says. "Generally, I draw on one layer and then send that part of the illustration to the back."

To specify the type of lines he wanted for the illustration, in the Basic Line dialog box under the Line menu he chose the settings—1.5-point line weight, round cap, and black line—and saved them; the new format then became part of the Line menu. Alsberg prefers to use round-cap lines (the ends of the lines are rounded, not flat) because they fit in better with the style of drawing he does.

After the line settings were in place, Alsberg selected the combination tool (⌘-6) and began drawing. Because this tool combines the capabilities of the curve and the corner tools, it enabled him to draw the lines in his illustration more accurately than he could have by using the corner tool and the curve tool separately. With the combination tool, you create a polygon with corners clicking from point to point; clicking and dragging at the same time creates a curve.

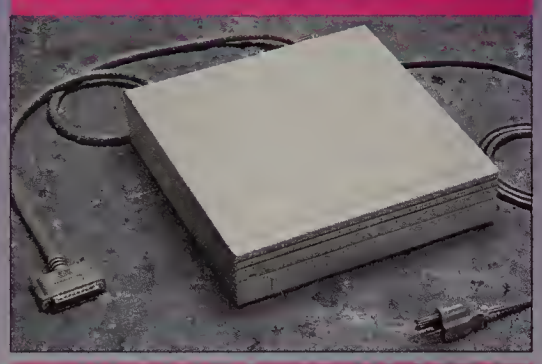
He drew some of the more complex curves by first zooming out to make the drawing smaller and then using the freehand tool. This enabled him to create fewer points along the line and allowed him to draw a complex curve in one fluid motion, more like brush-and-ink drawing.

After finishing the line drawing, Alsberg chose a lower layer (100) in which to create the colors. He specified None in the Line menu and used the combination tool to create a closed shape for each book by tracing its outline; then he filled them with color and sent them to layer 1. After creating the blue background (for the water), he sent it to layer 2, since he wanted the water to partially overlap the books. Back in layer 100, he filled in the rest of the colors, using Send to Back to layer each new color over the last.

To simplify the process of drawing the many crescent-moon shapes that appear in the illustration, Alsberg used both the corner tool and curve tool. He found that placing one curve point between two corner points creates a perfectly smooth arc between the two corner points. To create a crescent, he first selected the corner tool (⌘-9) and clicked to make a point. Next he switched to the

(continues)

Quantum



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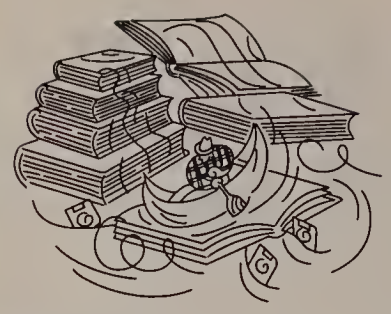
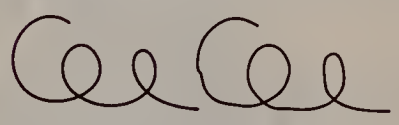
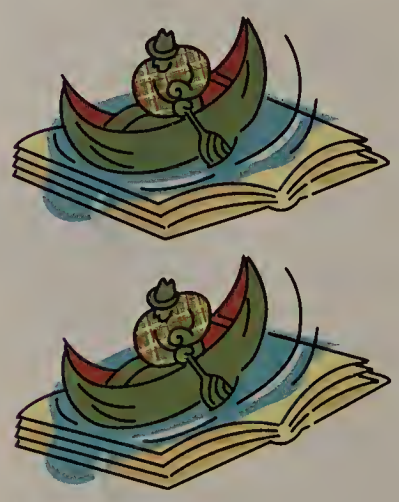


The original line drawing after the artist traced it from the TIFF file he'd scanned and pasted into FreeHand.



One of the squiggly lines drawn with the freehand tool; the smoothly curved line on the left is made up of fewer points because it was drawn in zoom-out mode. The line on the right, drawn zoomed in, looks lumpy because its many points cause more variations in the curve.

To automatically create a smooth crescent-moon shape (left), the artist alternately used the corner tool and the curve tool. Using the combination tool or the freehand tool would probably have produced irregular curves (right), requiring point-by-point editing to smooth out the lines.



Not satisfied with the position of the canoeist in relation to the rest of the drawing (top), the artist grouped the lines and colors that made up the man, the canoe, and the book underneath him; then with the skew tool he pulled on one of the grouped element's handles to flatten it out and rotate it slightly (bottom).

curve tool (⌘-8) and made another point above or below the first point. To complete the arc, he went back to the corner tool and made a third point; after using the curve tool to draw a point above or below the first arc, he completed the crescent by selecting the corner tool and clicking on the very first point.

Next Alsberg used the straight line tool to draw all the lines that made up the man's shirt. Then, to give the shirt its plaid look, he selected the lines he wanted and chose Basic under the Line menu to change the line color from black to either yellow or orange.

Alsberg was dissatisfied with the position of the man in the canoe in relation to the rest of the drawing; he selected the lines and colors that defined the man, the canoe, and the book underneath, and grouped them all. Then, after choosing the skew tool, he repositioned the grouped elements and distorted their dimensions by pulling on one of the four handles.

But now, more than the shape of the elements was distorted. In FreeHand 2.0, when you alter grouped elements in any way—such as by reducing or stretching—the weight of their individual lines changes as well. To return the lines to the weight Alsberg had originally specified, he ungrouped the elements, selected Layer Control, and isolated the layer that contained all the lines (layer 200) by making it the only active layer. Then in the Line menu, he clicked on the line settings he had originally created. ■

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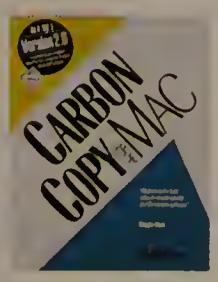

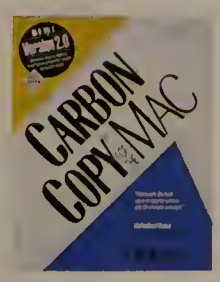

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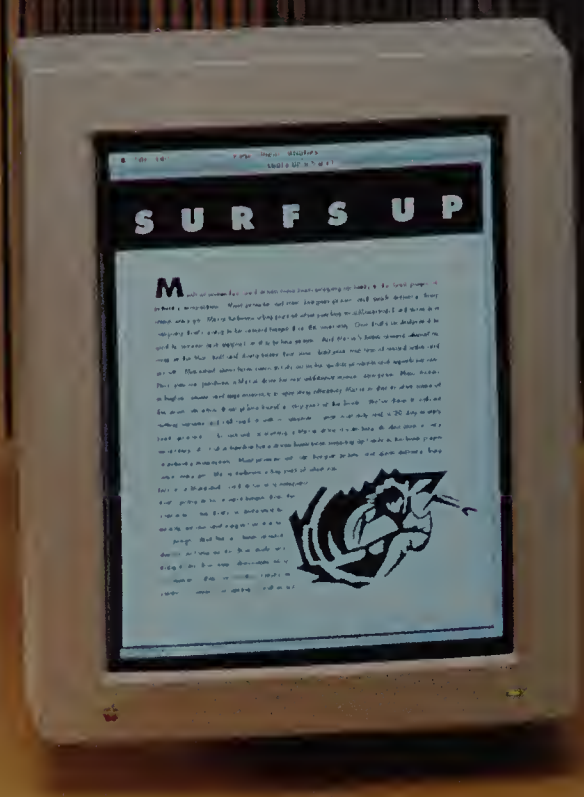

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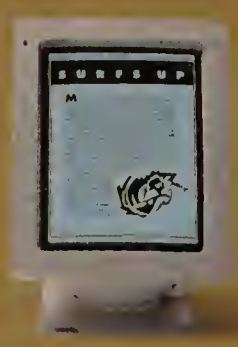

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The Rime of the Ancient Marketer

A CAUTIONARY TALE FOR LITTLE GUYS IN THE MAC MARKETPLACE

BY STEVEN LEVY

Macworld Expo is a time when the entire Macintosh community plays peacock. The booths are big and lush, the aisles packed with customers, and the parties tastelessly lavish. Wine flows and people stuff their mouths with shrimp. Everything seems dipped in an oily sheen of success. But when you make an effort to really talk to people, especially some of the smaller vendors who once constituted the heart of the Mac universe, you sometimes glimpse a dark side behind the glitz.

For the past few years, I've made a point of chatting with Dave Johnson, the president of Working Software, to soak up the latest news from his quarter of the industry. The news has not been great. We've talked in snack bars at Boston's Bayside Exposition Center and on park benches outside San Francisco's Civic Auditorium, but not at Dave Johnson's booth: Working Software can't afford a booth of its own. Which is not to say that his products and his support of them are not excellent—they are. But virtue often goes unrewarded, and the Macintosh market has been no exception to this cruel reality. Listening to Johnson's tale, a reverse morality tale that goes back to the early days of the Mac, I feel I'm hearing a long and emotional saga . . . sort of a Rime of the Ancient Marketer. I think it bears repeating.

Dave Johnson, a slim, affable fellow, now 37 years old, came to Silicon Valley from Detroit in the early 1980s. It was the big computer boom and Johnson, a software engineer, was part of a contemporary gold-rush–style migration. He settled in idyllic Santa Cruz, California, and went to work for Atari, the ultimate high-growth company, just in time to see dunderheaded suits take the place down in flames. (The company was later revived.) Then he worked for another high-flying game company, where he witnessed another business disaster. Johnson and his car-pool buddy, Mike Greene, watched this senseless decline and brainstormed about how things might be better arranged. Why not a company that eschewed the big rip-off and instead did things with the customer first in mind? A company built on service, not on slick packaging; a company that offered sensible products, reasonably priced. Why not?

ROBERT HOLMGREN

Like a roller coaster, the software business has ups and downs. Dave Johnson has seen both.

Hard Working

In 1985, Johnson and Greene decided to start that company. They called it Working Software, dedicated it to providing quality software for the Macintosh, and began creating the first product, a spelling checker called Spellswell. It shipped in January 1986 and did "very well for a company in a garage," says Johnson. With the revenue and recognition that came from Spellswell and other products, including a file-locating program called Findswell, Working Software quickly became one of the Mac's most valued small developers—part of a community that by passion and prod-

(continues)

uct helped keep the Mac afloat in its time of travail.

In late 1986, Dave Johnson bought out his partner. Now fully in charge, Johnson was forced to think long-range. With the success of the Mac Plus the market was changing, and he felt a real temptation to take the plunge into rapid growth. "I was jealous of the companies with glossy ads—'real' companies," Johnson explains. "I thought that we needed the full-page ads, retail distribution, better packaging."

It really wasn't much of a choice. Like some sharks, or like Woody Allen's relationship with Diane Keaton in *Annie Hall,* the more modest Macintosh developers had to move forward or die. Otherwise, the bigger competitors, with their marketing clout and their ability to get exposure in stores and mail-order outlets, would eclipse the little guys. It was already happening—Working Software, which at best had only been breaking even, was beginning to see its sales slip.

So Johnson hired more people and moved to bigger offices. He changed his product packaging so it would fit on store shelves and catch the browser's eye. He expanded the product line, introducing sets of custom dictionaries for Spellswell. He invested heavily in developing a new flagship product, a program that would provide everything a user would need to churn out business letters, to be called QuickLetter.

The latter decision had its hellish consequences. QuickLetter cost a lot to develop, and, as often happens, it was late. Originally planned for early 1987, it didn't ship until December 1988. People who bought it loved it. But not enough people bought it. The company was in trouble.

I remember Dave Johnson at the Boston Expo in the summer of 1989. Not only could he ill afford to properly display his products, but he couldn't easily manage hotel accommodations—he was sleeping on the floor of someone's house, 40 minutes from Boston. Due to a complicated distribution arrangement with another company, his products had been overshipped and literally no product revenue was coming into Working Software—none. He had sold his house to keep the company going. From a high-water mark of nine full-time employees he was now down to three. Not surprisingly, he sounded depressed, not only about his company, but also about the fate of others like it.

"I don't know if *any* small companies will be around soon," he told me. "Nine companies sell over 90 percent of the software, and over a hundred are fighting for the rest. Apple used to help companies like us, but now Apple has no idea who we are. We used to get dramatic help from them—they'd buy our products, literally help us keep going. Not any more." In retrospect, it seemed that

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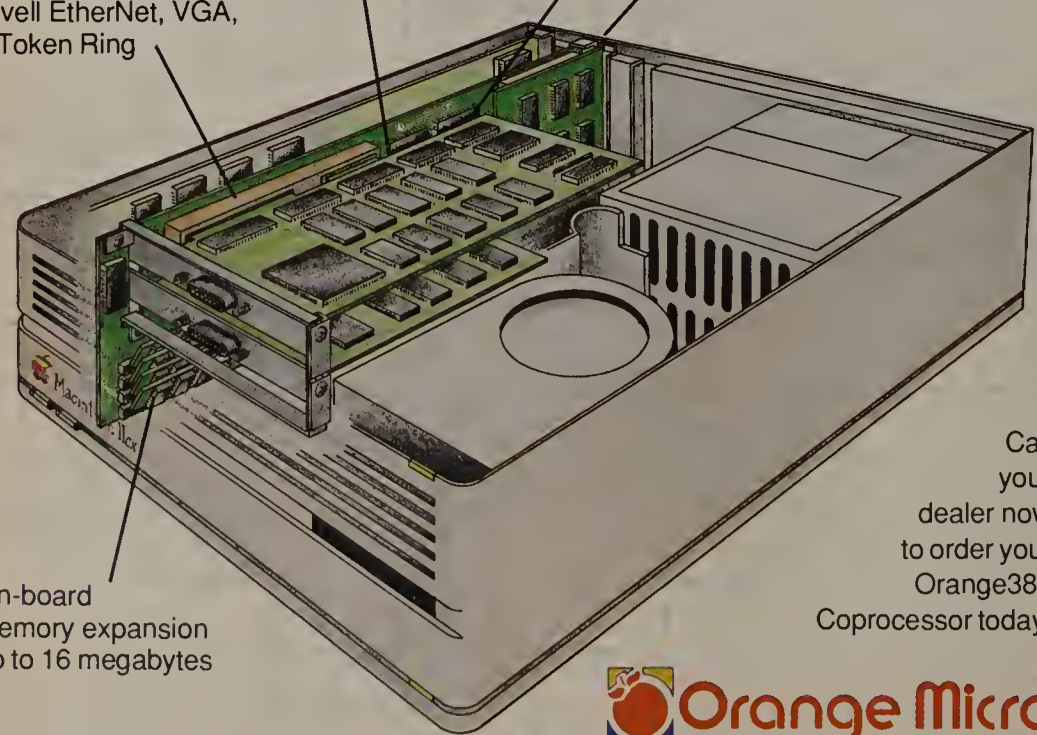

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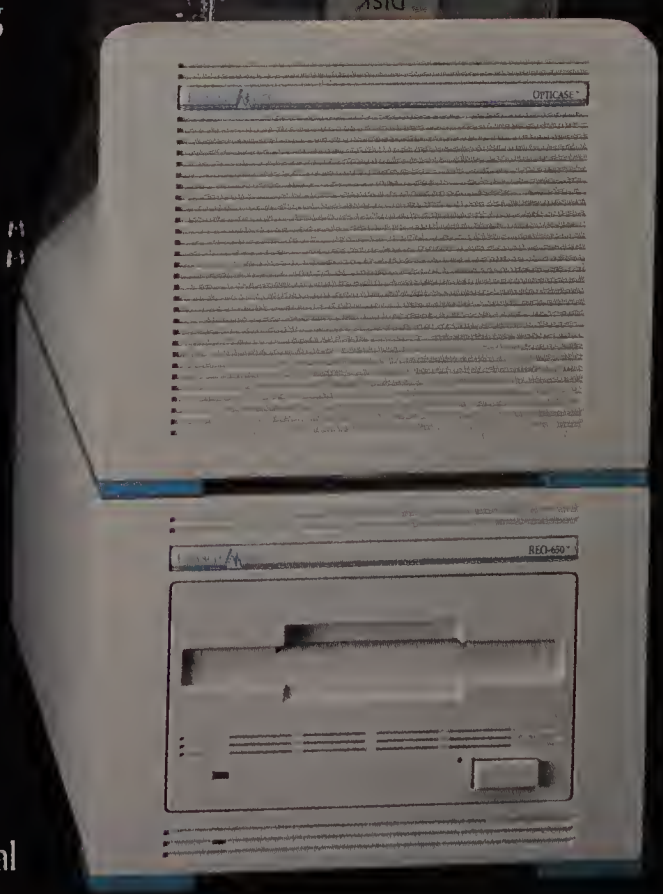

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to be successful, a company needed big capital to buy those full-page ads, to purchase space in mail-order catalogs, to keep the company going through the long development cycle of new products.

What seemed to shake Johnson the most was the seeming repudiation of his most basic belief that if you treated your customers well, they would patronize you in return. "We learned the hard way that customer service doesn't work. People don't appreciate service until after they've already purchased the product. Spellswell is now in its 25th version [the total is now 29], and all but 3 of those upgrades were free—the others cost $10 or $15." Even the idea of low pricing didn't seem to appeal to customers. "When we raised the price of Spellswell from $49 to $59, sales went up," he said. "When we raised it to $75, sales went up again!"

But despite the evidence, Johnson vowed that he would never swerve on his policy of customer service. That way, if the company finally went bust, he would at least be able to say that he did it without cheating anybody. Especially himself.

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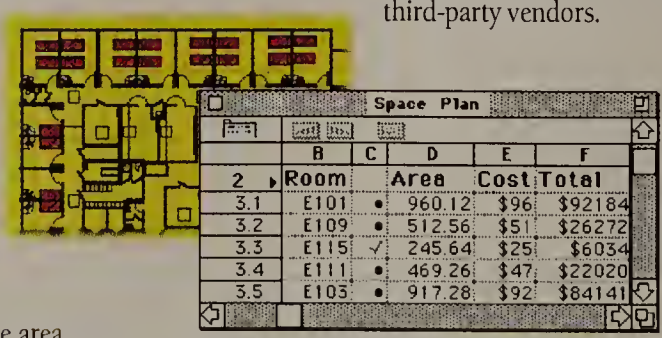

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Reversal of Fortune

My guess then was that Working Software was soon to be a goner. But at the San Francisco Expo in April 1990, when I next spoke to Johnson, he seemed slightly more upbeat. He actually could afford a hotel room, albeit one that required a trip down the hall to use the toilet. A troublesome lawsuit with the programmer who wrote QuickLetter had been resolved, and his distribution seemed somewhat straightened out—Working Software was actually selling products. The company had also gotten some revenues from producing programs on commission for other companies (such as Correct Grammar for Lifetree Software, a neighbor at the time), and QuickLetter 2.0—impressively upgraded—was on the way.

But not everything was rosy. Apple had just instituted a policy that required developers to pay $750 for the privilege of being authorized to write the software that would support the Mac. Since Working Software couldn't spare the cash, Apple declared it no longer an authorized Mac developer. Dave Johnson wrote to an Apple executive, pleading to let his company slide on the developer fee, and got his wish. But the incident was revealing.

"The Mac is great," said Johnson then, "but the people who own the Mac, the possessors of the patents, aren't so great." Noting the huge settlements that Apple executives were receiving upon being laid off in corporate reshuffling, he asked, "Do you think a guy who makes over a million dollars if he gets fired cares about the marketplace?" The future still looked cloudy for Working Software. "We might merge with somebody," he said. "We have to. We can't get venture capital since we aren't

(continues)

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oriented to quarterly earnings. Maybe now that we're making some money . . . "

I sensed that things were worse than he was letting on, and later I found out that at that time, Working Software was indeed hanging by a thread. Dave Johnson now admits that if Apple hadn't waived the $750 developer's fee, the company would have gone bankrupt. As it was, in the fall of 1991, the company staked everything on one last chance.

The idea was to shift to direct-mail marketing. Johnson put discount coupons for Working Software products into upgrade packages. Then he swapped mailing lists with another company so he could send out marketing material. "We were literally scraping together the money to get out 200 pieces of direct mail," he said of the company's utter low point. "No one had been paid."

Just when the referee's count was approaching ten, something happened. Orders began coming in. Enough to keep the company going, enough to print more pieces of direct mail, which helped sell even more copies. As a result, Johnson says, "We had a tremendous last quarter. It was phenomenal how many people ordered our product." After that flurry, orders went up to the point where monthly sales were far exceeding the entire annual revenues of the previous year.

Johnson says that Working Software, now in its fifth year of shipping products, seems rejuvenated. His staff is back to 12, and rising. The company is paying its bills. A new product is ready to ship—called Last Resort, it saves keystrokes in word processing programs, keeping text alive even when the computer crashes. Other new products will come after System 7.0 ships. Things are going so well that Johnson is even planning a vacation. A full week away from work—his first since starting Working Software.

Still, Dave Johnson has no illusions. He knows that small companies are still at a nearly fatal disadvantage in the Mac marketplace. "The software business has changed completely," Johnson now says. "Mike Greene and I wanted to start a company with the kind of things engineers talk about. Free upgrades, good service, and quality products that don't cost too much. But it's a world of hard-core business types, and I'm learning that."

As for Working Software, despite the rejuvenation, "We're aware that the prospects of surviving on our own are not good," Johnson says. But he wouldn't welcome just any merger partner. "If you're not in the business primarily for money, it's hard to think of [losing your company]—but if we found the right partner . . . "

His sentence trails off, and I understand that to Dave Johnson, Working Software is not merely an enterprise. It's his life. ■

Macworld *columnist Steven Levy is writing a book on artificial life.*

"1989 Best Word Processor" MacUser U.K.

You might not think of using a word processor to reformat mainframe files but isn't it nice that Nisus® 3.0 can

Now, with the power of Nisus 3.0's built-in word processing language you can convert mainframe files, index every word in a 400 page book, or even compute a trigonometric function

```
0025000G5001 50630D PANSOPHIC  PANVALET    001 50860C WEST     WESTI
001 51000K IBM     DL/1      001
A & M RECORDS          LOS ANGELES   CA90028   2134480037C365200275
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3350        01610298058IBM 3420        00813298100IBM 4245        002
A & M RECORDS          LOS ANGELES   CA90028   2134480037C365200275
```

The sample above shows fixed length fields and fixed length records that are common in some mainframe files. That means you can not simply tell your conversion program to drop in tab or comma delimited spaces at the end of the text in each field. For most programs converting this would be complete chaos. And that's without eliminating the duplications and extracting just the information you want.

Nisus 3.0's word processing language makes short work out of the formatting, extracting, and elimination process. Note the results below, including the bold face and upper and lower case changes. We are not suggesting you buy Nisus only for its ability to convert mainframe files, but with this kind of power, imagine what else you can do.

A & M Records	1416 N LA Brea	Los Angeles	CA
A A Griffin Audio Eng	2145 W Central Ave	Springfield	MO
A B Chance Co	210 N Allen ST	Centralia	MO
A C Nielson Co	PO Box1297 30 S Main St	Fond Du Lac	WI

Most people believe that converting mainframe data into a format that you can use with a Macintosh is no trivial task. Companies spend thousands of dollars on the problem only to run into dead ends. Imagine their surprise when these companies learn that in less than half an hour, Nisus 3.0 can do for them what hundreds of thousands of dollars spent on equipment can not.

The power of Nisus not only lets you convert mainframe data, it lets you index every word in a document, and remove unwanted and nonessential words like "the, and, not, and of."

But the built-in word processing language isn't the only surprise in Nisus 3.0. It also has an integrated graphics capability that will let you do things that some layout programs can't such as rotate text, graphics, or even add arrows.

Nisus 3.0 has a robust list of features and—more important to you—benefits. Working with Nisus 3.0 is like discovering that a good friend has an increasing level of substance when put to the test.

So why don't you put Nisus 3.0 to the test. Discover for yourself how an elegantly intuitive word processor could convert mainframe files, do graphics, automatically index a book, or simply write a memo. To find out, call

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Microtek Scan

Original:
8 x 10 B&W print

Brightness level:
default

Input resolution:
150 dpi

Size: 388K

Output Resolution:
200 dpi

Line Screen: 150 lpi

Gamma Correction:
None

Silverscanner

Original:
8 x 10 B&W print

Brightness level:
default

Input resolution:
150 dpi

Size: 388K

Output Resolution:
200 dpi

Line Screen: 150 lpi

Gamma Correction:
None

Microtek Scan

Original:
8 x 10 color print

Brightness level:
default

Input resolution:
150 dpi

Size: 1103K

Output Resolution:
200 dpi

Line Screen: 150 lpi

Color Correction:
None

Silverscanner

Original:
8 x 10 color print

Brightness level:
default

Input resolution:
150 dpi

Size: 1112K

Output Resolution:
200 dpi

Line Screen: 150 lpi

Color Correction:
None

When it comes to selecting the right scanner, be forewarned. There is a difference you can see in black and white. And color. Just look at this comparison between the La Cie Silverscanner and the Microtek 300ZS. Both images were scanned at default settings with no corrections. This entire ad was then created and separated using Adobe Photoshop, Quark XPress 3.0 and a Linotronic 330.

As you can see, Silverscanner produced a better-looking image than the Microtek scan. Silverscanner lets you scan color, gray-scale, halftone and line art with dazzling clarity. La Cie gives you more with OCR compatability, faster color previews, versatile scanning controls and up to 1200 dpi.

La Cie Silverscanner

$1999*

La Cie Silverscanner: 16 million colors; 256 smooth shades of gray, production quality line art; up to 1200 dpi—all in a single pass.

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The Mac Zone

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64 Page Showcase

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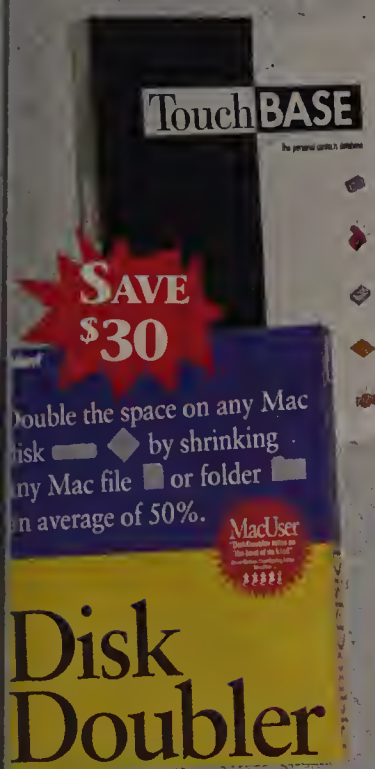

TouchBASE and DiskDouble Bundle

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To of the best new utilities avaiable and now on sale together from the MacZone. TouchBASE is a database to keep track of personal and business contacts. It's handy all the time because it is a desk accessory. TouchBASE can print envelopes, labels, address books, fax cover sheets, and reports.DiskDoubler compresses your files whenever you save them and expands them whenever you open them. In effect, it doubles your hard disk (and floppy disk) storage capacity.

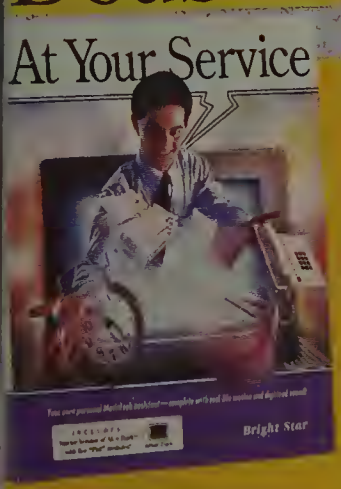
Microsoft Excel 3.0

$299

Microsoft Excel is the most advanced spreadsheet for the Mac. It combines a spreadsheet with business graphics and a database. It provides a worksheet area of 16,384 rows by 256 columns. Presentation tools, such as multiple fonts, variable row heights, shading, custom number formats, 68 built-in chart types and more, make Microsoft Excel the ultimate business tool. Excel has support from hundreds of other manufacturers' products and templates. Transfer Excel charts and worksheets into Word. Easy to update.

Microsoft #0227

SYSTEM 7.0 COMPATIBLE



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Add a friendly, polite assistant to your Macintosh, with real-life motion and digitized sound. Phil will notify you of important meetings, prompt you when phone calls need to be made and remind you when deadlines approach.

Bright Star Technology #0415

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The MaccessCard Reader is a very convenient security add-on for your Mac. Working in tandem with FileGuard 2.5 software, it controls access to your Mac using magnetically-striped cards and an (optional) access key. You can use the cards that come with the system or quickly train it to recognize any ID card, such as your VISA, ATM, company or student ID card. After a registered user turns on your system with the MaccessCard Reader, FileGuard continues to control access to your Mac's hard disk, partitions, folders, files, applications, desktop, etc.

ASD Software #0412

$395

LaCie Tsunami QLPS 50 MB Hard Drive

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Tsunami drives come initialized with SilverLining, the standard of hard disk utility software, and SilverPlatter Apple's system, five megabytes of public domain software and Norton Utilities are also included on the drive. LaCie features a warranty of 5 years on the Tsunami drive.

LaCie #3948

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The QuickImage 24 Video Frame Grabber captures 24 bit color or 8 bit gray scale images from full motion video. It fits in a single NuBus slot and does auto switching between NTSC and PAL signals. A Photoshop plug-in allows users to capture images directly into Adobe Photoshop. Now with PhotoShop Limited, while supplies last.

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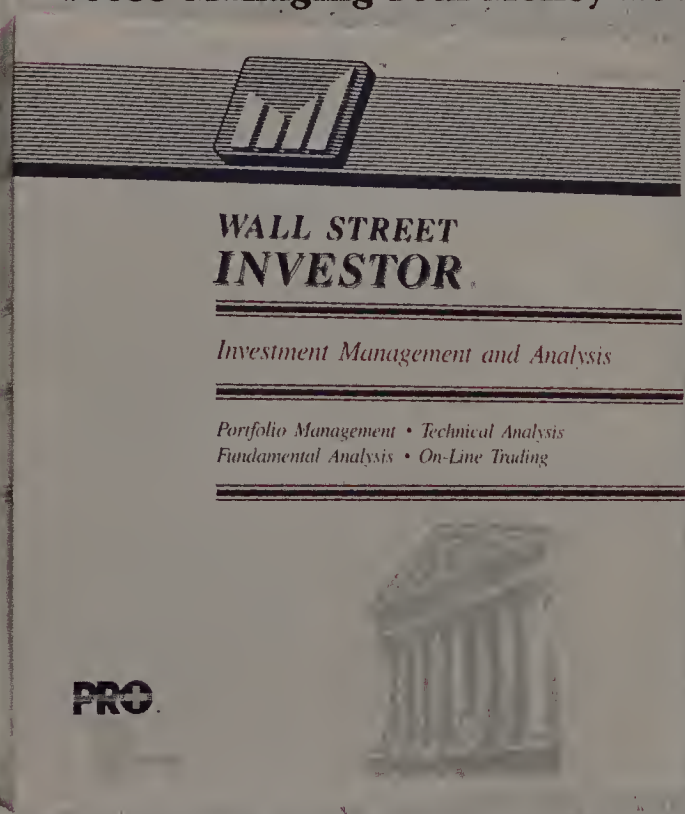
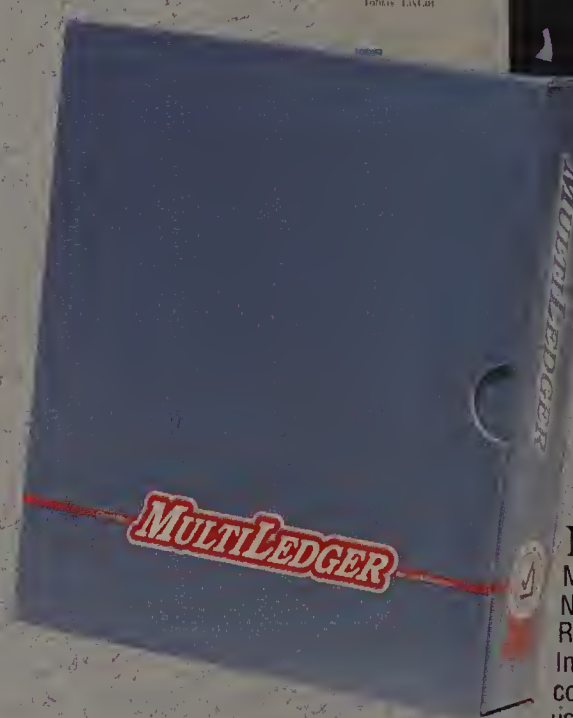
Andrew Tobias' Managing Your Money 4.0

Managing Your Money is the most innovative personal finance package available for the Mac. The user interface is pure Macintosh, with a host of icon buttons to make moving from place to place in the program easy. It also has lots of on-line help and comes with a comprehensive manual. Managing Your Money has six main parts: REMIND is a smart calendar. Enter the important dates in your life and you'll never forget them again; MONEY is the heart of the program. Here you'll record income and write checks. TAX keeps records and works with information that determines your final tax bill. PLAN helps you make rational plans for the future and figure out what various options will cost. It also estimates your life expectancy. INVEST helps you manage your investment portfolio. NET WORTH pulls information from the other modules to calculate what you're really worth.

MECA Ventures, Inc. List: $220

#0033 Managing Your Money 4.0 ..... $134





Wall Street Investor 3.0

The original Wall Street Investor handles portfolio management, technical analysis and on-line trading. Version 3.0 adds multi-account management, more reports, point and figure charts, real-time quotes, new trend studies, and adds data import-export capabilities.

Pro Plus Software List: $695

#2798 Wall Street Investor 3.0 .... $395

MultiLedger 1.3

MultiLedger accounting for the Macintosh. Now you can get General Ledger, Accounts Receivable, Accounts Payable and Inventory tracking all together in one completely integrated program. As easy to use as most one-write systems, but it's doing full double-entry accounting. Provides the internal controls and audit trails which are often missing from spreadsheet templates or database adaptions. Data entry is quick and easy.

Check Mark Software, Inc. List: $395

#2410 MultiLedger 1.3 ..... $234

#2411 Payroll Module $174

CheckWriter II Version 3.2

Completely rewritten, v3.2 is the most versatile finance software in its class! YOU'LL NEVER PAY A LATE FEE AGAIN!, because CheckWriter II automatically reminds you of bills that are due. Tear a check out of your checkbook and begin...NO WAITING FOR SPECIAL CHECKS. Any business or personal check can be used and checks can be printed on plain paper. V 3.2 offers complete budgeting, graphing, over budget warning, an address database with envelope/mailing label printing, tax summaries, cash projections, income vs. expense reports, importing/exporting of text files. Links with Aatrix Payroll for Complete accounting.

Aatrix Software List: $60

#0192 CheckWriter II V 3.2 ..... $31

Payroll Version 4.0

Easy-to-use program walks beginners through all the steps! Employee Paychecks are calculated in as little as two seconds. Checks can be customized to match any check, including laser checks. Federal, State and many local taxes are included. Incredible power allows eight customizable deductions, salary or hourly pay and it calculates FUTA, SUTA, SS and Medicare. W2's or any custom report.

Aatrix Software List: $199

#1871 Payroll V 4.0 ..... $108

Ultimate Payroll

Ultimate Payroll is the ultimate in payroll progessing and record keeping software. It calculates and accumulates all employee deductions, taxes, FICA and matching employer amounts. It prints out any government forms you require. You can use any check form you wish. Ultimate Payroll even keeps 16 pages of personnel notes for each employee. Special sections for tips, contractors, cafeteria plans & 401K plans.

Aatrix Software List: $399

#1875 Ultimate Payroll $188

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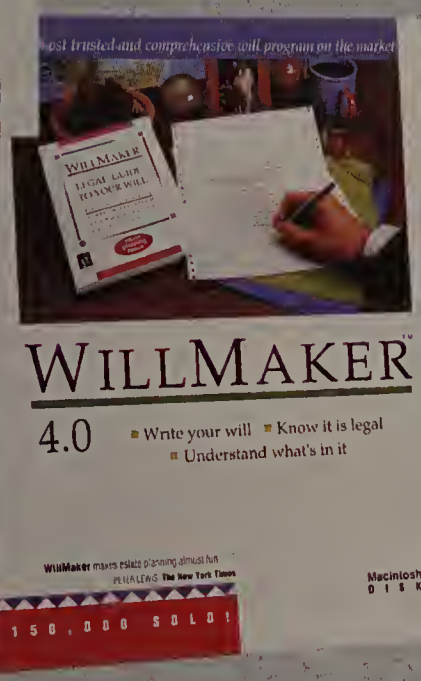
Dollars & Sense 5.0

Dollars and Sense has been a leading Macintosh program since 1984 because it eliminates drudgery. Your computer can generate checks, automatically record income and expenses, help balance your checkbook, and produce great-looking financial statements. At tax time your data will automatically be ready to prepare a return or to export to a tax program like Macintax.
Mindscape Inc. List: $100
#3464 Dollars & Sense 5.0 ...$62

For the Record 2.0

For the Record helps you keep track of all the important information in your life: credit card numbers, safe deposit boxes, emergency information, insurance policies, as well as a household inventory. It's both an estate planning and personal productivity tool. For the Record was cited by the *San Jose Mercury News* as a program "every family ought to have."
Nolo Press List: $60
#3781 For the Record 2.0 .....$31

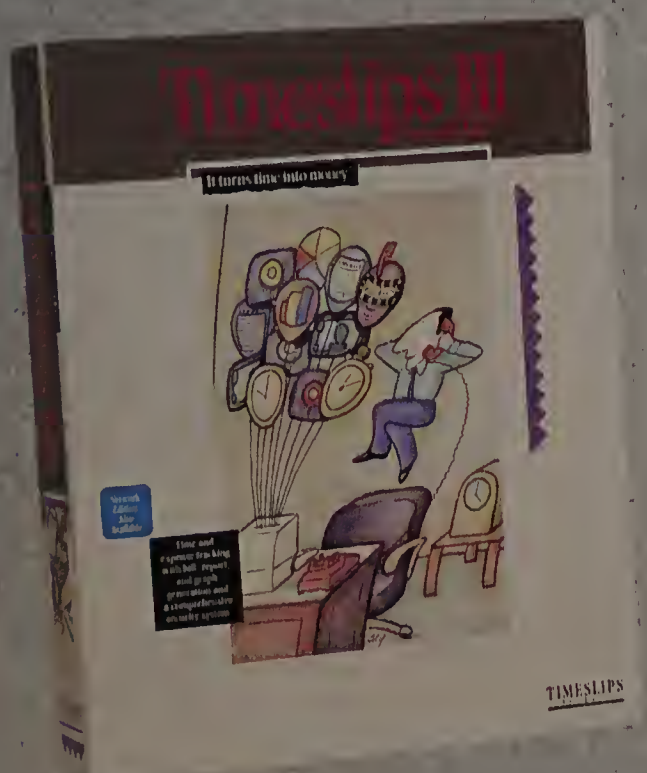


WillMaker 4.0 ★★★½

Write your own valid will without ever calling a lawyer. Just answer the questions that WillMaker asks and the program constructs a personalized will with full legal standing. Now you can provide for your spouse, children, grandchildren, friends, or even your favorite charities. You can even create a trust for minor children. Don't let the court decide what to do with your radio-controlled kite and art collection. Do it today!
Nolo Press List: $60
#0481 WillMaker 4.0 .....$36

At Once! ★★★★½

Let At Once! Take the worry out of bookkeeping. This fast, fully-integrated accounting package includes General Ledger, Accounts Receivable and Payable, plus Payroll. The list of indispensable features includes an extensive HyperCard tutorial and context-sensitive on-line help. You can fully customize reports. A built-in print queue lets you batch reports for unattended printing. For most businesses, this is everything you need, all in one place.
Peachtree List: $395
#2594 At Once!.....$284

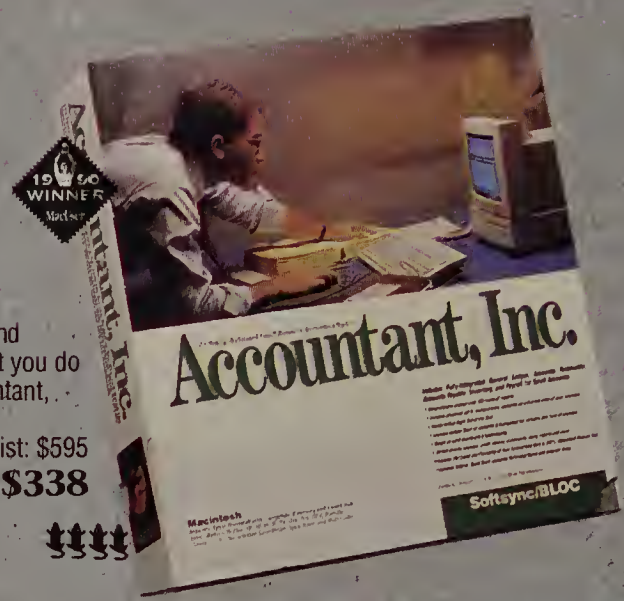


★★★★½

TimeSlips III 2.0

TimeSlips III for the Mac is the ultimate time tracking and billing software system. With it you'll find that your workday is being spent more productively, and that your billings are much more complete. The features and functions are so simple, they practically run themselves.
TImeSlip List: $299
#2512 TimeSlips III 2.0 .....$194

$3 Overnight shipping via Airborne Express!



Accountant, Inc. Pro 2.0

Accountant, Inc. is perfect for any type of business - retail, manufacturing, service or professional. It provides reports and performs analysis like no other software, so you can do what you do best and stop worrying about the accounting chores. Accountant, Inc. is a fully integrated accounting system.

Softsync/Bloc Publishing List: $595

#3986 Accountant, Inc. Pro 2.0 ...$338

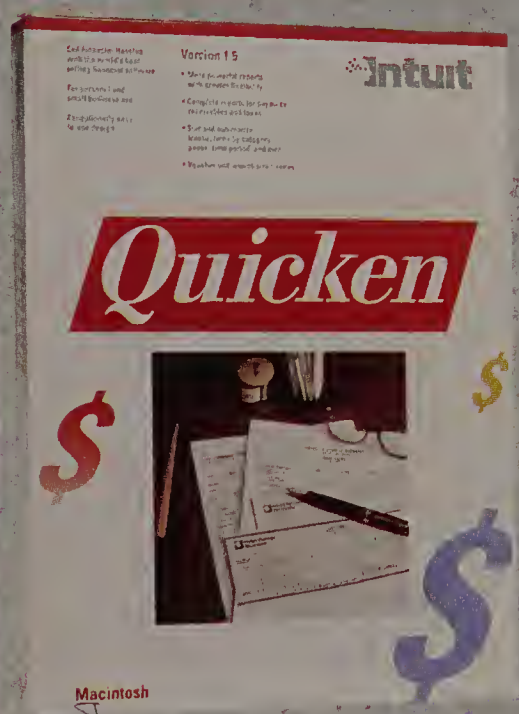
$$$$

WealthBuilder

Calculate your net worth by using templates to create a personal profile, balance sheet, and budget summary. If you use Quicken, Andrew Tobias' Manage Your Money, or MacMoney, you can import your data directly. Establish realistic financial goals and objectives and then take action!

Reality Technologies List: $170

#3769 WealthBuilder $98

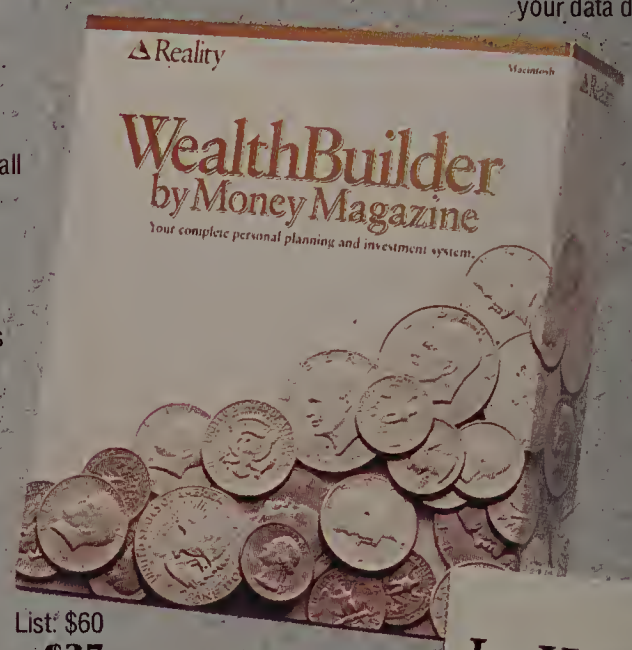


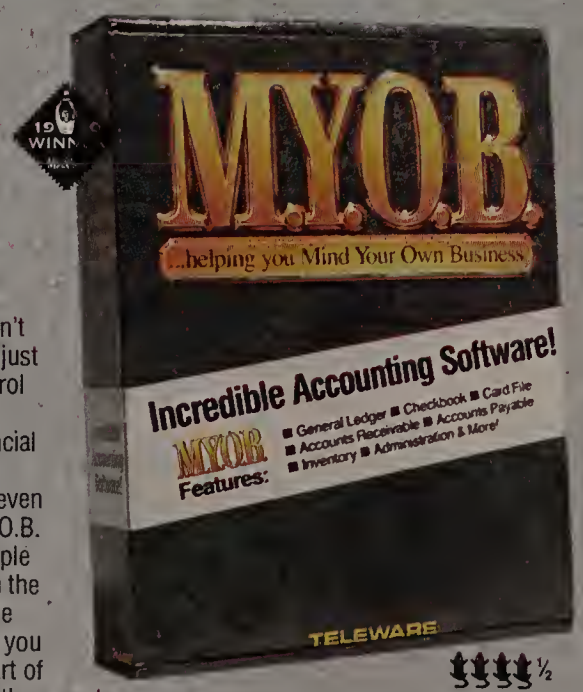
Quicken 1.5

Quicken does personal and small business accounting with a simple checkbook. For regular payments, it performs all the bookkeeping, hands you the checks, ready to sign and addressed for mailing. It tracks tax deductibles and prints itemized lists. Quicken also reconciles bank statements, provides detailed reports on profit and loss, income and expenses, and makes budget versus actual comparisons. *MacUser* rated it a full Five Mouser.

Intuit List: $60

#2591 Quicken 1.5 ...$37





M.Y.O.B.

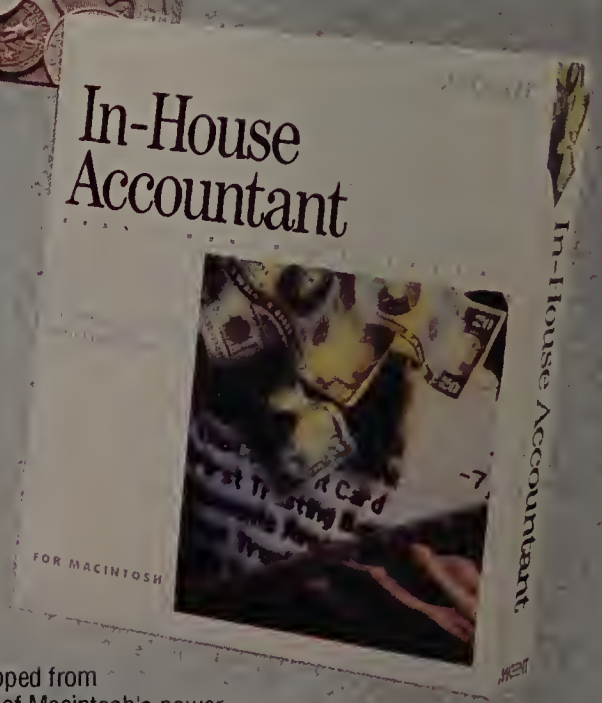
M.Y.O.B. combines a powerful, fully integrated accounting program with management tools you can't find anywhere else! With just a few clicks, you can control every facet of your business...print your financial reports, reconcile your checkbook, do invoicing, even call your customers. M.Y.O.B. is easy to learn and is simple to use, so it makes "doing the books" a breeze. Its unique graphic navigation moves you instantly through every part of the program. Here's what the experts say:

"Using M.Y.O.B is simple and direct." — *Macworld* "There are several unusual features that make the program easy to set up, easy to use." —*MacWeek* "Setting up the systems is really easy." — *Macworld*

Teleware List: $249

#3535 M.Y.O.B. $141

$$$$½



In-House Accountant

In-House Accountant is the first accounting program for the Macintosh that's powerful enough for any small business, but easy enough for just balancing the checkbook at home. In-House Accountant was developed from scratch to take full advantage of Macintosh's power. Familiar point-and-click operations let you see at a glance all of your financial information, anytime you want. Entries made in the transaction list immediately update all related items in other lists, so there's never a need for "posting." The program handles payables and receivables, by letting you move among various accounts without ever having to change modules, or even close a window. Prints professional-looking reports, with different type styles and sizes as well as bar graphs and pie charts.

In House software, Inc. List: $200

#3782 In-House Accountant $135

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Microsoft Office

Four essential business-productivity applications in one special edition. Each is an industry standard in its category: word processing, spreadsheet, desktop presentations, and electronic mail. The Microsoft Office helps business professionals power through their day's work faster than ever. Use Microsoft Word to write memos and reports; Microsoft Excel to crunch numbers and create annual-report-quality graphics; Microsoft Power Point program to create impressive presentations; and Microsoft Mail to instantly share information. Each is a top-selling stand-alone program In its own right -- used together, they maximize that productivity for your entire office.

Microsoft List: $849

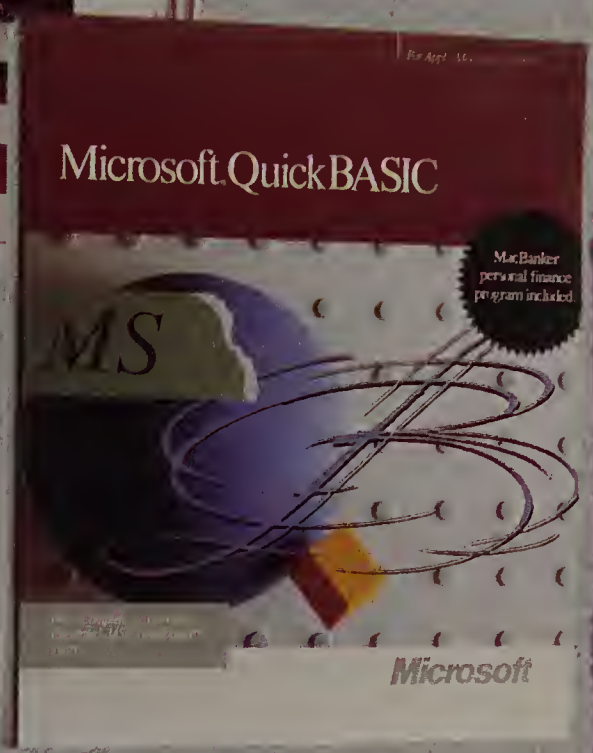
#2678 Microsoft Office $524

Microsoft Excel 3.0

Microsoft Excel is the most advanced spreadsheet for the Mac. It combines a spreadsheet with business graphics and a database. It provides a worksheet area of 16,384 rows by 256 columns. Presentation tools, such as multiple fonts, variable row heights, shading, custom number formats, 68 built-in chart types and more, make Microsoft Excel the ultimate business tool. Excel has support from hundreds of other manufacturers' products and templates. Transfer Excel charts and worksheets into Word. Easy to update.

Microsoft List: $495

#0227 Excel 3.0 .....$299

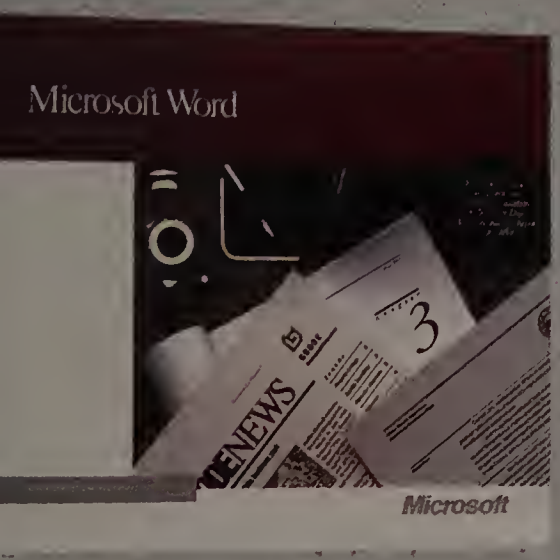


Microsoft Quick Basic 1.0

Put the Interpreter and Compiler under one roof. The enhanced Compiler sub-launches compiled programs with its interpreter for easy Edit/Compile/Run/Edit cycles. It supports the 68020 (and 68881 FPU), and permits recursive sub-programs.

Microsoft List: $99

#2054 Quick Basic $63



Microsoft Word 4.0

Design pages with different numbers of columns on the same page. Place sidebars exactly where you want them. Automatically wrap text around graphics. Tables are a breeze. Just enter the number of rows and columns you need and Word generates your table with automatic text wrap within cells. Word 4.0 even has facilities for creating mathematical formulas. It has a spelling checker, hyphenation, style sheets, a glossary, automatic indexing, mail merge and an integrated outliner. Coupled with a connectivity program such as MacLink, Word 4.0 on the Mac is compatible with the MS-DOS version of Word and with PageMaker (both Mac and PC versions) so you can exchange files among all these formats. Version 3.0 won the 1988 *MacUser*/Europe Victor and *Macworld* World Class awards.

Microsoft List: $395

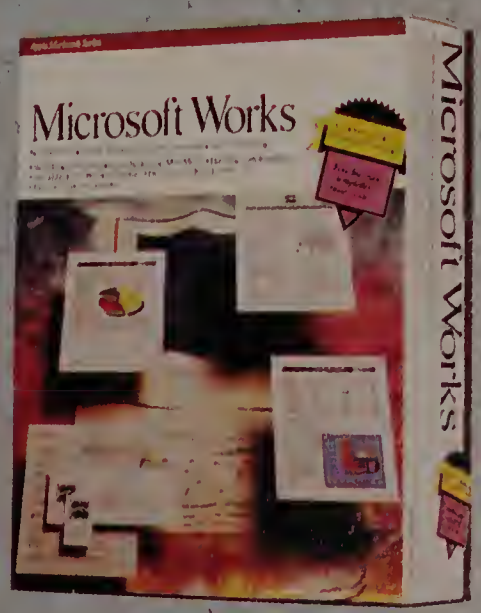
#2238 Word 4.0 .....$244

Microsoft Works 2.0

Microsoft Works 2.0 seamlessly integrates the five most-needed office applications: spreadsheet, database, word processor, desktop publishing with drawing and word processing documents. The drawing tools and linked columns of the desktop publishing section let you create professional-style layouts. The communications section makes E-mail and on-line work quick and easy.

Microsoft List: $295

#0567 Works 2.0 .....$183



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Established 1986

TouchBASE

TouchBASE is a database to keep track of personal and business contacts. It's handy all the time because it is a desk accessory. TouchBASE can print envelopes, labels, address books, fax cover sheets, and reports. It's even a multi-user product so you can share your database on a network or use it all by yourself.
AfterHours Software List: $125
#3908 TouchBASE.....$88

MacEnvelope 5.0

MacEnvelope 5.0 prints customized envelopes and labels, with EPS, PICT or PICT2 graphics, plus text messages. Use MacEnvelope's template library, or create your own with new WYSIWYG layout capabilities. Postal bar codes save money on bulk mailings. Use as an application or as a new Desk Accessory. Stores 1600 names per file, sorts alphabetically or by ZIP codes.
Synex List: $129
#3142 MacEnvelope 5.0 .....$56

C.A.T. III

C.A.T. III is a relational database for professionals in Sales Marketing, and Management. It has been designed specifically to help you mange your Contacts - Activities - Time. If your success depends on the number of contacts you make, and your ability to track, cultivate, or service them, then C.A.T. is the right tool for you.
Chang Laboratories List: $495
#3634 C.A.T. II $288

Data Desk

If you really want to understand something you've got to see it for yourself. That's the idea behind Data Desk. No matter what kind of data you're looking at-in research, education, business or government- the visual tools of Data Desk reveal it in surprising new ways. Data Desk brings the philosophy of Exploratory Data Analysis into vibrant practice, right on your desktop.
Data Description Inc. List: $595
#2210 Data Desk $458

Double Helix 3.0

With Double Helix 3.0 you can create customized applications quickly—without having to be a computer genius. The icon-based programming language and Version 3.0's new HyperCard-like interface combine to let you develop user-specific custom menu systems with password protection, as well as unlimited number fields, records and files. You can tailor applications easily to reflect your changing requirements. Applications work on multi-user Macintosh LANs or on Macintosh/VAX networks.
Odesta List: $595
#0609 Double Helix 3.0 .....$388

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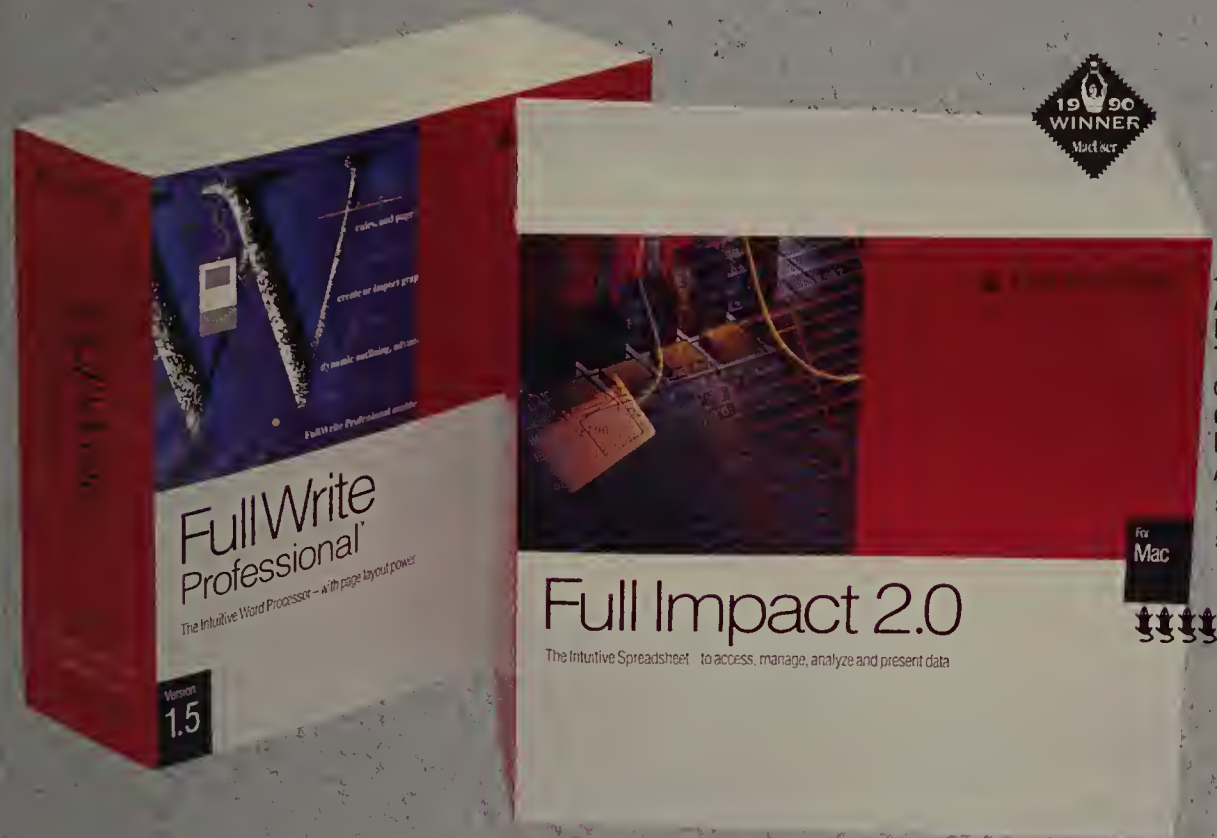
Over 1600 Products in Stock



Ashton-Tate

Ashton-Tate gives you the value of the season! Buy either Full Impact 2.0 or Full Write Professional 1.5 and Ashton-Tate will send you the other free! Full Impact 2.0 competes head to head with Excel and WingZ. Full Write delivers advanced word processing to every user - even beginners.

Ashton-Tate — List: $395 each

#3772 Full Write 1.5 .....$145
#2011 Full Impact 2.0 ....$145

Informed AutoForm

Informed AutoForm turns any form created with Informed Designer into a stand-alone application, called an AutoForm. An AutoForm can permit or restrict capabilities, depending on how the form will be used. AutoForm offers an ideal method of gathering information. When data is intended to be used in other applications, such as a spreadsheet or database, AutoForm can simplify the entry process. Using the intelligence within a form including calculations, defaults, choice lists, lookups, error checking, formatting and custom help messages, the accuracy of information is assured while the entry process is made significantly faster and easier.

Shana Corp. — List: $149

#3990 AutoForm $74

Informed Designer

Use Informed Designer to automate and computerize your routine office paperwork. Shana has made it easy to produce professional quality custom forms in just minutes! Data can be printed onto custom stock, or the entire form (including data) can be output together. With the Informed Mini-Manager (sold separately) you can fill out and organize the forms on your Mac!

Shana Corp. — List: $295

#3722 Informed Designer $158

Informed Manager

Informed Manager is used to fill out forms created with Informed Designer. Using intelligent features such as calculations and formatting, Informed Manager makes entering information into forms both fast and accurate. You can then use its built-in database to find, sort, and manipulate completed forms. Informed Manager has flexible printing options. Options include: printing single or selected forms; data only onto preprinted forms; both the form and data onto blank paper; or data and selected graphics only.

Shana Corp. — List: $195

#0101 Informed Manager $98

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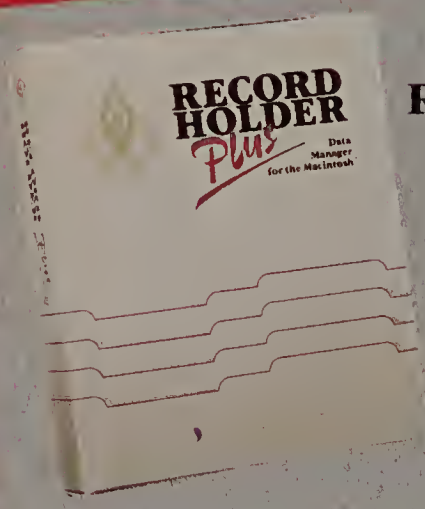
We accept corporate, educational and institutional purchase orders with credit approval.



Record HolderPlus

The easiest-to-use data manager. From mailing labels to the most complex forms, RecordHolderPlus adds color and graphics capabilities and much more at the same low price. Put graphics and color in your reports anywhere you need them, store pictures in your data base, print text or graphics in any color on ImageWriter II. Up to 32,000 characters per field or record. Print multiple maining labels across. Data entry is easy with "you-design" window formats.

Software Discoveries — List $150

#3760 RecordHolderPlus $84

Sales & Marketing Manager

In this world of fast paced markets and even faster paced sales, you must have the marketing software to keep up with the world. Sales and Marketing Manager is a five part program that improves your control of all sales and marketing. It allows you to set up individual companies or divisions. Whether you are one sales person working for many companies or one company with many divisions you can now keep full control.

LISI — LIST$395

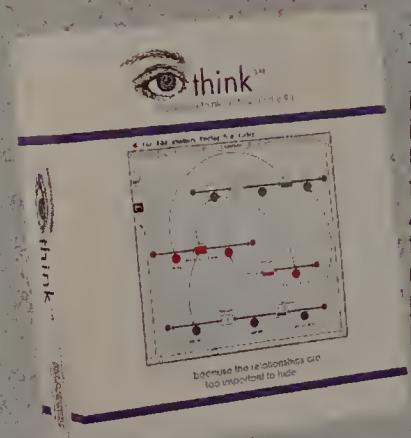
#3989 Mtg. Manager $295

Omnis 5

Omnis 5 is a relational and/or hierarchal database program that has been designed to fully utilize the graphical interface, enhance memory, storage and color capabilities of both Macintosh and IBM PS/2 hardware. It is a comprehensive program for developing business data-management applications. Omnis 5 includes Omnis Express to allow a user to produce outline requirement of an application, and with a click of the start button it automatically builds the Omnis 5 application.

Blyth Software, Inc. — List $1,000

#2538 Omnis 5 .....$648



i think

The visual thinking tool of the 90's, i think is a complete rewrite and enhancement of the Stella package. It includes all of the features of Stella, plus many more. Users create four graphic building blocks to piece together a picture of an issue they would like to analyze. As they build the picture, i think automatically generates the equation framework "behind the scenes". i think allows users to perform discrete-event, as well as continuous process modeling.

High Performance Systems, Inc. — List $450

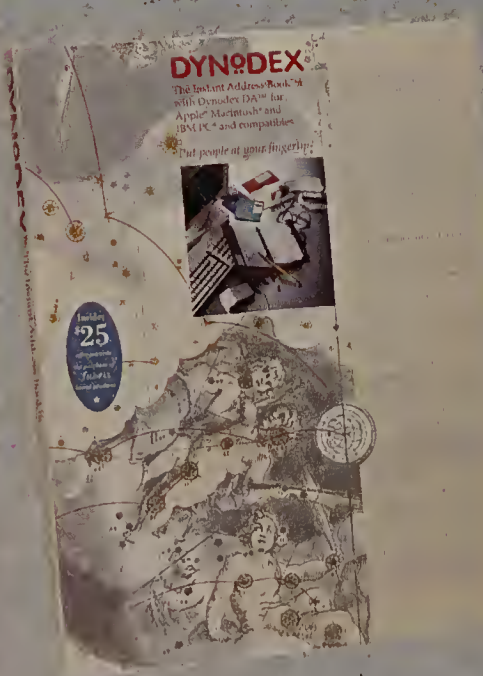
#3836 i think $375

Planisoft

Planisoft is a powerful time and resource management tools that can be shared between Mac's and PC's over any network. Planisoft offers the power to organize events, make more profitable use of resources and control valuable assets. It comes packed with a wide range of features that allow a user to: manage agendas, find available time slots, research contact history, keep track of deadlines and priorities, administer and monitor availability of material resources, and exchange data with spreadsheets, word processors and databases.

ASD Software, Inc. — List $249

#3612 Planisoft $138

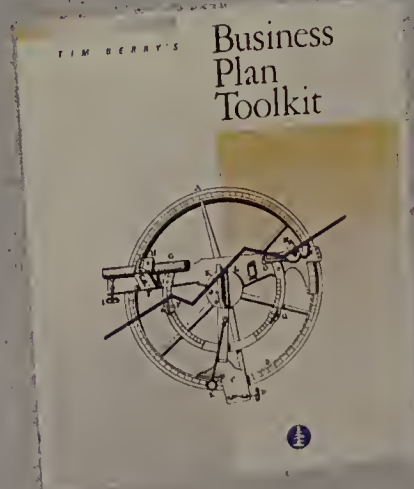


DynoDex 2.0

DynoDex is the electronic address file that gracefully manages your most important information–names, numbers, addresses, and notes on people. DynoDex puts people at your fingertips – both on the computer and on the road. Instantly look up and dial any number you need from the full-powered DynoDex database or the handy desk accessory.

Portfolio Systems

#0119 DynoDex 2.0 .....$71



Business Plan Toolkit

If you're have a small business person or are an entrepreneur attempting to raise capital or secure a loan, this package is for you. Business Plan Toolkit is a practical guide for preparing a professional business plan with complete financial analysis, charts, sales forecasts and winning text. A complete sample plan is included on paper and on disk. Using your own word processor, the program is especially helpful for doing financial statements and making all the numbers match up. Received high praise and 4.5 mice from *MacUser*. Works with either Excel, Wingz, Works and any SYLK compatible spreadsheet.

Inman Software — List $150

#3910 Business Plan Toolkit ...$95

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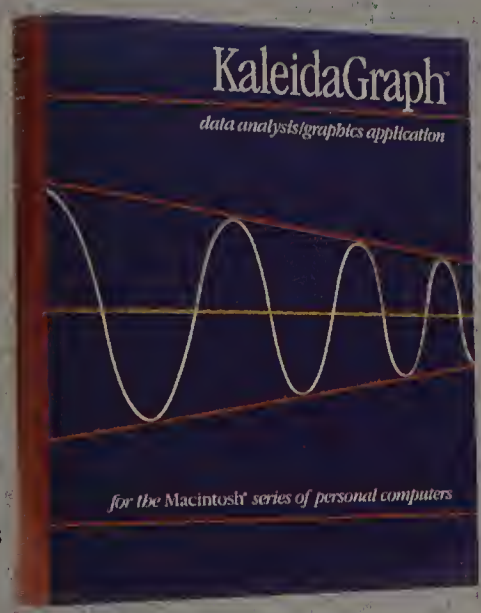


Kaleidagraph 2.0

Kaleidagraph simplifies the process of analyzing and presenting statistical information. It provides 12 different graph structures, including scatter, histogram, probability plot, polar, as well as more common types such as line, bar and pie. You can crunch large amounts of data (up to 32,000 points per column) and plot up to 10 variables at once. Supports both the LaserWriter and the ImageWriter (and color on the ImageWriter II).

Synergy List: $249

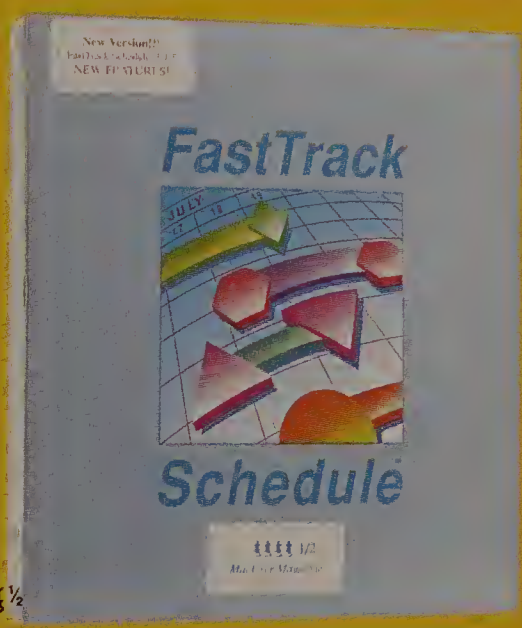
#2006 Kaleidagraph 2.0 .....$144

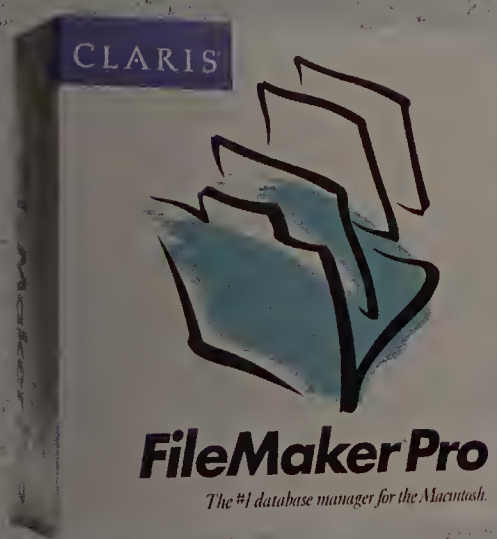
FastTrack Schedule 1.5

FastTrack Schedule 1.5 produces GANTT charts in outline format. It has flexible fiscal year formats, multiple activity columns, word-wrap for text, start and end point offsets and custom generic units. It won't take up your time with complicated setup and extensive data entry. But it will print informative charts with graphics showing progress reached.

AEC List: $235

#3456 FastTrack $138





FileMaker Pro

FileMaker Pro is an extended flat file manager. Its look-up function extracts information from other files—which is what most people really need. The new graphics tools streamline the generation of reports and layouts. User-definable buttons automate repetitive tasks or activate Scripts. The Script editor simplifies creation and editing so you can make custom applications. You'll appreciate the new data entry aids, such as check boxes, radio buttons and pop-up menus. If you purchased FileMaker II after April 1, 1990, the upgrade to FileMaker Pro is free direct from Claris.

Claris List: $299

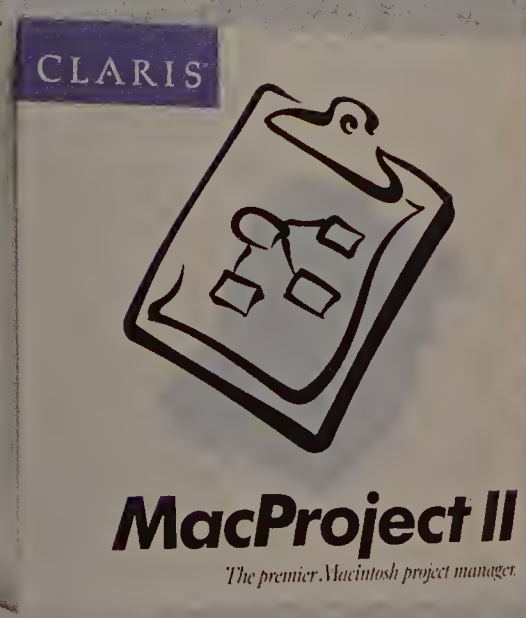
#3478 FileMaker Pro $214

MacProject II 2.1

MacProject II brings structure and discipline to chaos. It helps you make decisions, set limits, and establish deadlines before you start. Along the way, it tracks time, personnel, resources, and budgets, so projects don't run out of control. MacProject II prints progress charts and reports for the entire team. Version 2.1 includes over 20 new features, such as Data Import/Export, a Resource Leveler, and On-Line Help.

Claris List: $459

#2202 MacProject II $358



WingZ 1.1A

Using WingZ is like having a spreadsheet with page layout and presentation graphics all rolled into one. The program can place resizable graphics and text fields anywhere on the page. Its HyperScript programming language makes custom applications easy to create and use.

Informix List: $595

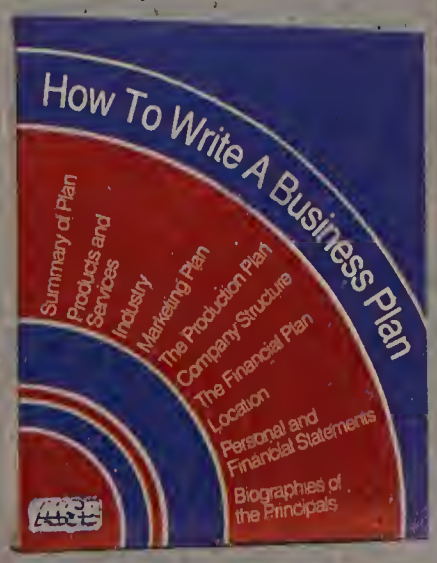
#2224 WingZ 1.1A ...$244

How to Write a Business Plan

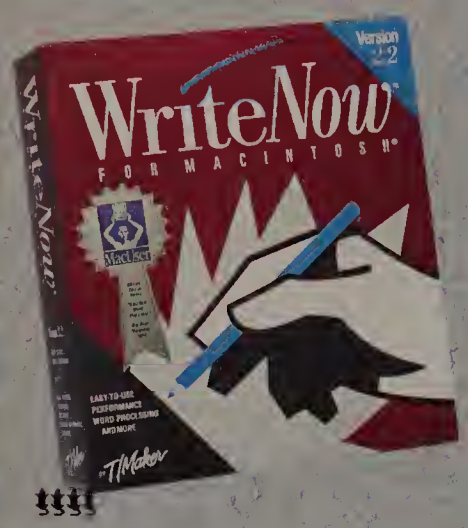
The one software package that provides you with a complete, written, business plan. Includes entire narrative plus all financials and spreadsheets. Makes the preparation and writing of your plan as easy as ABC. This package prepares your projected three year profit and loss, balance sheet and cash flow statements. How to Write a Business Plan also provides you with all of your business plan's written sections, including marketing, products and R & D. Use your existing word processing software to produce your final business plan. Ideal for individuals, companies, lawyers and CPA's.

AISB List: $125

#3565 How to Write a Business Plan $85



Over night delivery only $3

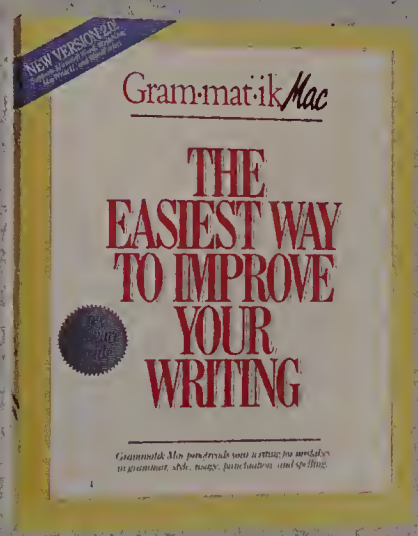


WriteNow 2.2 with Grammatik Mac

WriteNow 2.2 combines a fast, powerful word processor with a large collection of writer's tools. For example, it includes the Grammatik Mac 2.0 grammar and style checker, a built-in spelling checker with a 135,000 word dictionary and the WordMaster Thesaurus. In addition, WriteNow offers all the features you expect in a word processor, including mail merge, label templates, date formatting and multiple columns. It can even import Word 3.0 and 4.0 documents for maximum flexibility.

T/Maker List: $199

#2052 WriteNow 2.2 with Grammatik Mac Bundle ..$116



GEOvista

GEOvista™, a geographic presentation system, displays data on presentation-quality maps. Information can be imported from other applications or entered directly from the keyboard. Areas of the map are shaded to represent data ranges selected by the user. Included with GEOvista are 52 template maps, one for each of the 50 states subdivided by county, and maps of the U.S. subdivided by state and much, much more.

Newton Technology, Inc. List: $249

#0226 GEOvista $169

FileForce

Create files for customers, then build a relational file manager simply by linking the files together. Create an invoice that automatically looks up customers, enters each line item into its own file, then computes extended price, tax and total for you. Print form, summary reports, mailing label, mail-merge letters, and graphs using information from any file. FileForce combines the simplicity of file mangers with the power of relational databases.

Acius List: $395

#3330 FileForce $248

KiwiEnvelopes

Now you can retire your typewriter for good! KiwiEnvelopes is a simple, easy, and fast DA solution for printing one envelope at a time on your Macintosh. Use it to print envelopes without leaving your current application. Just select and copy the address in the letter you're writing, open KiwiEnvelopes and click the Print button...that's all! It's always accessible under the Apple menu and requires little memory. Often-used addresses can be saved and recalled at the click of a mouse.

Kiwi Software List: $50

#2917 KiwiEnvelopes $32

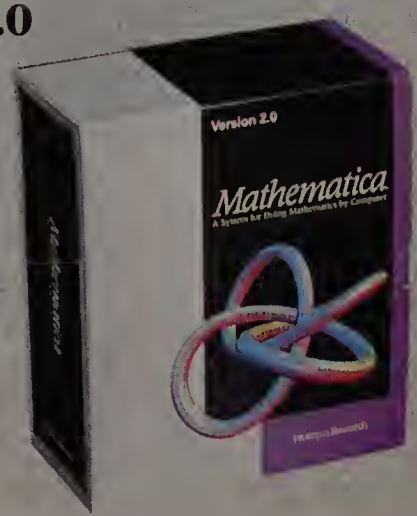
Mathematica Enhanced 2.0

If numbers are your business, Mathematica can do numerical, symbolic and graphical computation. It can be used as an interactive calculation tool and a programming language. Numerical capabilities include arbitrary precision arithmetic and matrix manipulation. Mathematica 2.0 can manipulate formulas directly in algebraic form, performing such operations as symbolic equation solving, integration, differentiation, and power series expansion. Produces two- and three-dimensional PostScript graphics.

Wolfram Research

#3524 Mathematica 2.0 Enhanced $648

#3523 Mathematica 2.0 Standard $448



4th Dimension 2.1.1

4th DIMENSION is the ideal database for novice, intermediate and power users. 4th DIMENSION will keep pace with your needs with its automatic button scripting, multi-page layouts, superior relational strategies, streamlined data management and easy-to-use procedures. Built-in Quick Report, label generator, and graphing tool provide point and click data analysis and reporting. NEW! This version supports the 4th DIMENSION Environment including, 4D CALC, 4D WRITE and 4D COMPILER. Find out why 4D is the best selling relational database for the Macintosh!

Acius, Inc. List: $795

#2648 4th Dimension 2.1 .....$488

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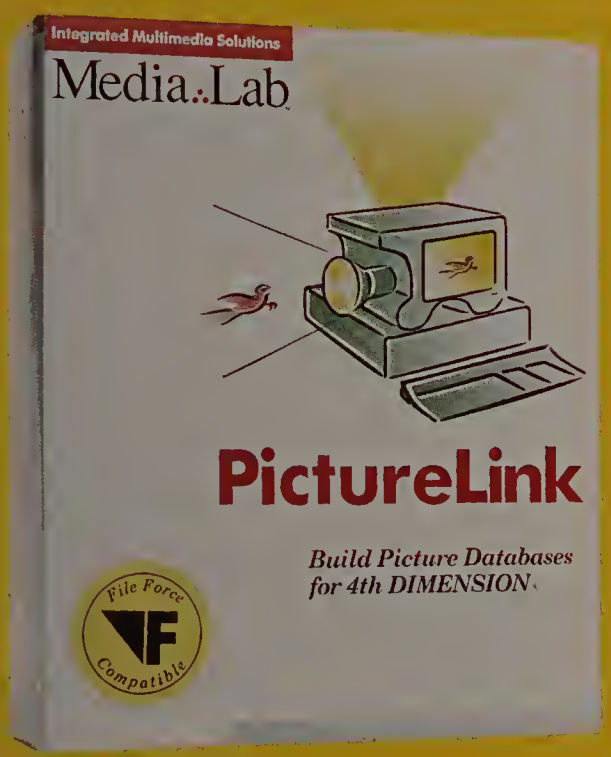
PictureLink

Picturelink imports real-world full-color images (photos, artwork, 3D objects, anything) into your database using a variety of methods. Scan into PictureLink directly from black and white or color scanners. Even grab real-world images in real-time from video sources such as cable TV, video cameras, or other instruments. Also import images directly by opening numerous file formats and by cutting and pasting from the Clipboard or Scrapbook.

PictureLink has potential application in such fields as banking (signature verification), inventory control, personnel management, security, real estate, medicine, and scientific research.

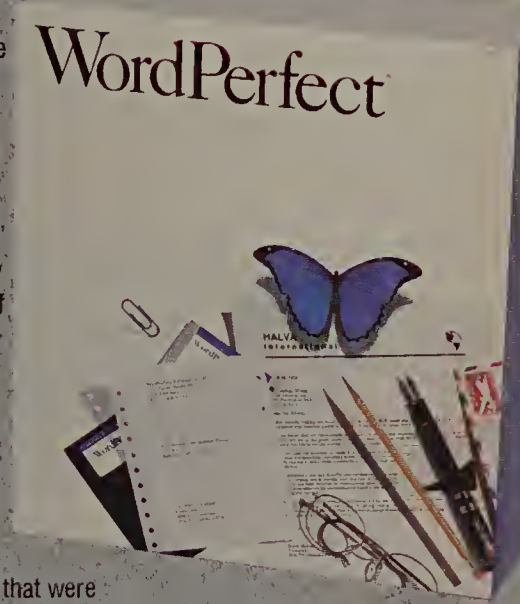
Media Lab List: $395

#3774 PictureLink ..$219



WordPerfect 2.0

From the #1 word processing company, comes a program designed around you, the user. With cross-platform support and features such as on-screen columns, text boxes, styles, borders, graphics drawing/editing, macros/editor, sort, merge, table of contents/index generation, table of authorities, line numbering, language support, 125,000-word speller and on-line thesaurus. Version 2.0 almost transparently imports and exports MacWrite and RFT documents, as well as WordPerfect documents that were created on such platforms as VAX, Unix, Data General, NeXT and IBM PC.



WordPerfect Corp. List: $495

#3972 WordPerfect $278

OffLine

How to build a complete database for all your disks. OffLine builds a complete database of all your files on all your disks. OffLine is the revolutionary disk management system that has given new meaning to the term "ease of use." With OffLine, you can safely store seldom-used files on floppy disks where they belong, secure in the knowledge that you can find them in an instant.

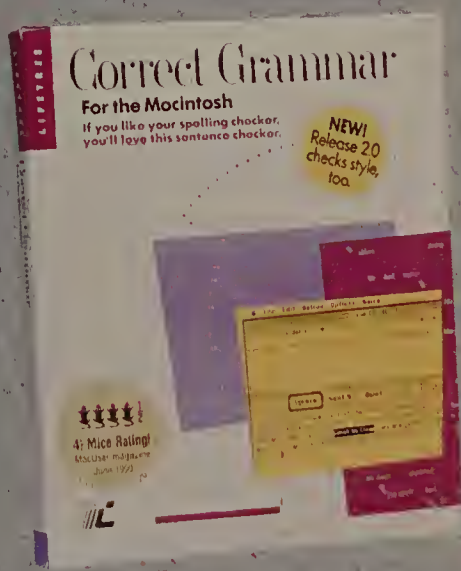
You can locate a file in seconds - even if it's hidden in an archive - by typing any part of its name, or by examining the contents of any disk, or by specifying the application that created it. For power users, there's an advanced method for searching by file type or creator.

SNA, Inc. List: $99

#0410 OffLine ...$59

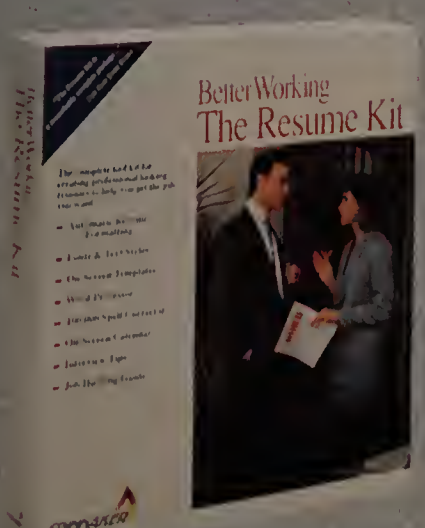
Correct Grammar 2.0

Correct Grammar is a writing assistand for word processing software. In a single pass through a document, Correct Grammar highlights phrases containing questionable grammar, spelling, syntax, punctuation and style, and suggests alternatives. In addition to grammar checking, it helps users avoid stylistic errors by highlighting vague word choices, cliches, jargon, wordiness and other common pitfalls that weaken or confuse written messages.



Lifetree Software List: $99

#3813 Correct Grammar 2.0.....$49



Resume Kit

The Resume Kit is a remarkably complete package for managers, professionals, students or anyone who needs a great looking resume fast! Get everything you need to write, format, and print a truly great, professional looking resume and cover letter - in less than an hour! The Resume Kit takes you through a step by step process to organize the important information you need to include in your resume.

Spinnaker List: $40

#0433 Resume Kit $25

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WORD PROCESSING

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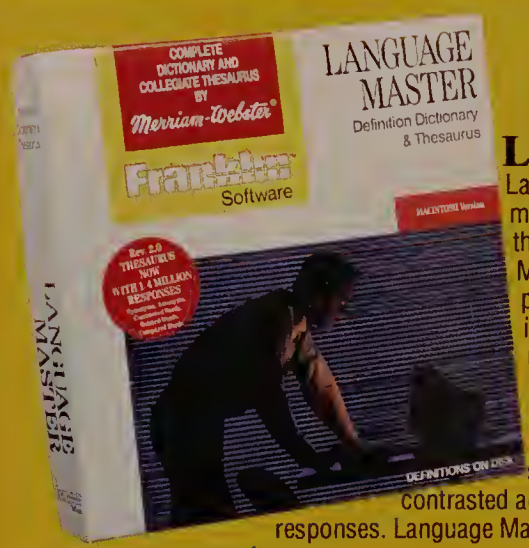
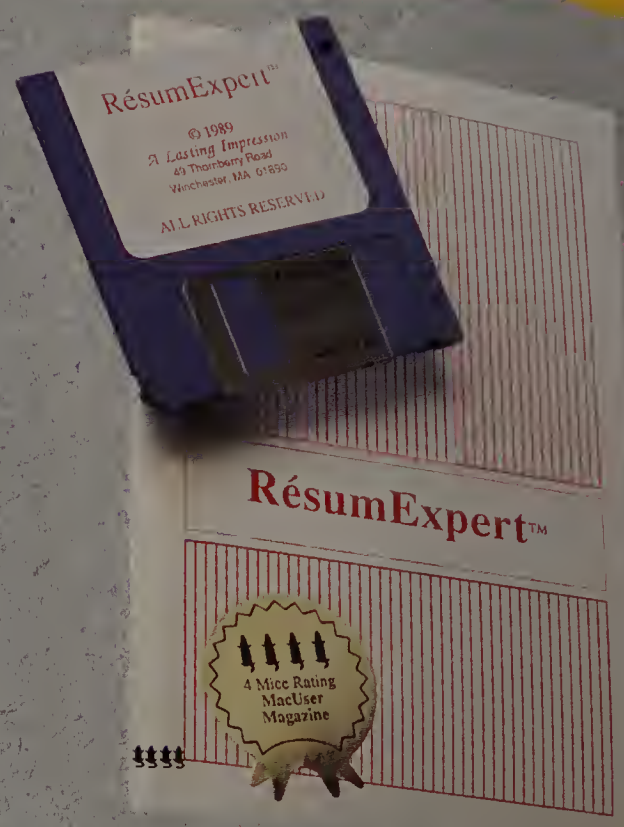


Language Master 3.0

Language Master is an easy-to-use, memory-resident definitions dictionary and thesaurus compatible with all popular Macintosh word processors. Based on data provided by Merriam-Webster, it provides instant access to complete definitions, usage notes, hypehnation and part of speech information for over 80,000 words. The theasurus includes 1.4 million responses for over 40,000 entries: synonyms, antonymns, compared, contrasted and related words. It also inflects all responses. Language Master is THE definitive choice in linguistic software.

Franklin List: $80

#0010 Lanugage Master 3.0 .....$44



RésumExpert

Advance your career with professional help. RésumExpert creates job-winning resumes from students to CEO's. Designed by a resume-writing pro, the RésumExpert Software Series is an impressive collection of eye-catching resume and cover letter templates for Microsoft Word 3.0 or 4.0 and WriteNow 2.2. Each of the 10 editions provides over 40 distinctive and completely-formatted layouts. Easy to use—just select the appropriate template and replace the text with your own information. The highly-rated manuals provide expert tips for quickly composing professional-quality resumes and cover letters. *MacUser* rated it 4 Mice!

A Lasting Impression List: $75

#3103 RésumExpert $47

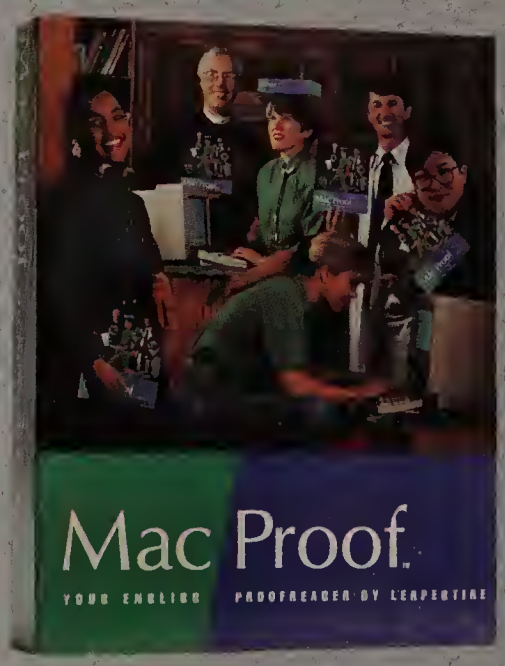
MacProof 3.2.3

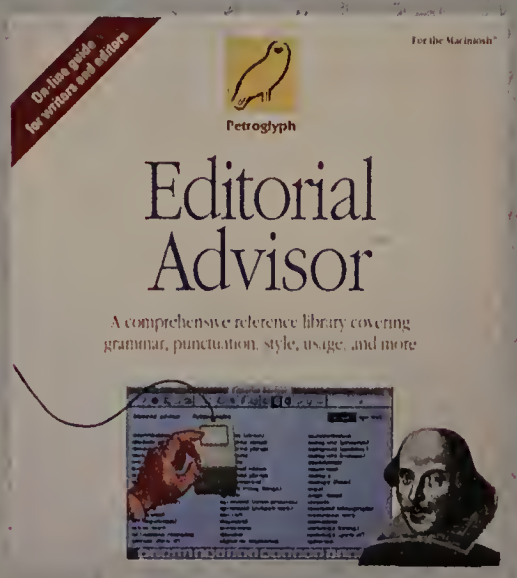
MacProof 3.2.3 is your English proofreader. Without leaving your document, you can use this handy Desk Accessory to proofread any open word processor document. MacProof checks for potential errors in punctuation, spelling, capitalization, word usage, style and structure. You can customize the Usage and Spelling dictionaries to your specific requirements. It includes on-line help and a complete user's manual.

Lexpertise List: $195

#1123
MacProof 3.2.3 .....$114

Unavailable at press time. Call for details.





Editorial Advisor

No, it's not a grammar checker. Editorial Advisor is a computerized style manual that covers grammar, punctuation, style, usage and more. Learn the conventions of editing. Give your writing that professional edge. With System 7.0, you can install Editorial Advisor on your DA menu. It's like have a reference library on your hard disk.

Petroglyph, Inc. List: $150

#3944 Advisor $74

Ventura Publisher–Macintosh

Powerful, fast and accurate, Ventura Publisher, Macintosh Edition, provides typeset-quality desktop publishing. Ventura Publisher professionally formats files created with word processors, graphics programs, scanners or within Ventura Publisher itself. Ventura is the product of choice for creative documents such as brochures and newsletters, or long structured documents like books, technical manuals and catalogs. It is fully compatible with all Ventura Gold Series PC versions and supports AppleShare, TOPS, Novell and PSN networks. It imports a wide variety of text and graphics files from both the PC and Mac.

Ventura Publishing List: $795

#3909 Ventura Publishing $498

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Mariah

Mariah is the first true multimedia organizer that lets you manage graphics, sounds, animation and text files together in one high-speed environment. Unlimited size and number of collections! Cut & Paste between collections and applications. Play sounds and animation. Record audio items directly, Import and Export Sound and PICT resources to other documents or applications such as HyperCard.

Symmetry List: $149

#3983 Mariah $85

Personal Scanner for the Mac

Great assistant for scanning graphic images, text, and numbers.

Typist

Typist is the personal scanner for Macintosh. It gives you all the raw power of a small typing pool, right on your desktop. Scan rows of numbers directly into your spreadsheet. Scan columns of text directly into your work processor - with the click of a button. The Typist can handle virtually any font, or font size, and enter it directly into your application in what ever format that you happen to be using - as if you were typing it yourself. The Typist is more than a typical hand scanner which is generally suited to scan graphic images, but is limited when it comes to text and numbers.

Caere List: $695

#3659 Typist $478

PageMaker 4.0

PageMaker 4.0 goes beyond the paste-board metaphor that made the original PageMaker a smash hit. New features include a blindingly fast Story Editor, extended support for color, the ability to rotate text, a built-in dictionary and spell checker. Files can be up to 9999 pages in length and multiple files can share a common index. Special "Hot Links" can be established between PageMaker documents and the graphics and data files they contain, so that updates in the attached files are automatically imported into the PageMaker document. You also get much more sophisticated type control, including the ability to adjust the look with point-sized dependent kerning on any text in increments of .01 point and a condense/expand range of 5% to 250%. PageMaker can import color graphics images stored in TIFF and EPS format and can use PANTONE, RGB, HLS, or CMYK color models to create color separations with Aldus PrePrint.

Aldus List: $795

#3223 PageMaker 4.0 .....$498

FreeHand 3.0

Aldus FreeHand 3.0 combines an elegant interface with exceptional power to give the easiest-to-use tool for creating professional-quality graphics. And its range of features makes it the most comprehensive drawing and graphics program you can use-from initial design all the way to color prepress production. Whatever your field, you'll find in Aldus FreeHand 3.0 a unique combination of ease of use, powerful performance, and versatile production features -for graphics and text.

Aldus List: $595

#3947 Freehand $398

Pantone Process Color Imaging Guide

The PANTONE Process Color Imaging Guide is the perfect companion to all Pantone-licensed software programs. It provides a visual comparison of solid PANTONE Color and process simulations as they would appear on the final printed piece. As many PANTONE Colors cannot be satisfactorily reproduced in four-color process, this publication provides the user with the information to best decide whether to specify spot or process color while working on the desktop.

Pantone, Inc. List: $75

#3435 Pantone Guide ... $48

★★★★½

Quark XPress 3.0

XPress 3.0 boasts a more intuitive user interface, many new features, plus redesigned and reorganized documentation. New measurement and page palettes provide the user with interactive on screen access. A library stores frequently-used items and a pasteboard provides a work area next to each page. You can group text and graphics as single elements and rotate them a full 360 degrees in 0.001 degree increments. Color trapping ensures precise color printing.

Quark List: $795

#3488 XPress 3.0 ..... $518

BannerMania

When you have something special to say, call on BannerMania! BannerMania lets you produce spectacular designs - with styles and effects that are available nowhere else. Stretch type, distort shapes, then prints smoothly with perfectly formed characters - and without the "jaggies"!

Broderbund List: $60

#3970 BannerMania $36

Easy Color Paint 2.0

Easy Color Paint 2.0 will bring many colorful and fun-filled hours to your Macintosh LC or any Macintosh II. It's suitable for any user skill level: window locking for beginners, fancy menu options and a pressure-sensitive pen for pros. Print your masterpiece in color to the ImageWriter II or any Color QuickDraw printer. No wonder it's a Finalist for "Best Personal Creativity Program" in this year's Software Publishers awards. See for yourself what all the excitement is about.

Creative Software List: $89

#3862 Easy Color Paint 2.0 .. $44

$3 overnight shipping on Airborne

StrataVision 3D

StrataVision 3d is realistically the best 3D program on the Mac. Already donned with industry awards there's even greater power with version 2.0. Extended modeling gives you more control over objects. Apply realistic textures, set reflectivity and soften shadows with improved ease. Animations of linked objects offer stunning results. StrataVision 3d 2.0 also has a realistic price. Whether your an illustrator, designer or a tinkerer, StrataVision 3d offers the realistic solution.

Strata, Inc. List: $495

#4001 StrataVision 3D $348

The Mac Zone
Established 1986

MacVision

MacVision controls the image digitizing process. The software automatically adjusts the displayed image to the screen characteristics. MacVision also provides a variety of wary to modify the digitized images. The software in not copy protected and is supplied on an 800K double-sided 3.5" disk.

Koala Technologies Corp. List: $499

#3705 MacVision $258

ClickPaste 2.0

The one-click-per-paste intelligent scrapbook. Paste objects anywhere, anytime. No windows to open, no wasted time. Imagine an instant hierarchical scrapbook that's available with a click of the mouse. Press a keyboard combination that you have defined and click – a hierarchal menu appears with text and graphic objects, right where you clicked! It's your very own portfolio of frequently used Macintosh data.

Mainstay List $100

#0173 ClickPaste 2.0 .....$59

Capture 4.0

Capture images form video cameras, VCRs, and other video sources quickly and easily. Integrated images into applications such as inventory databases, personnel files, record keeping, desk top publishing, news letters, presentation graphics and story boards.

Mainstay List $130

#0174 Capture 4.0 .....$69

DeskPaint 3.03/Desk Draw

DeskPaint is a 98K DA that works as well with black & white images on a Macintosh plus or classic as it does with color images on all IIsi or IIfx (even in 24-bit color). It reads and writes PICT, TIFF, and MacPaint files. It does smoothing, auto-trace, graduated fills, multiple windows, and a lot more. DeskDraw is a DA comparable to MacDraw. Some of it's features include hairlines, rotated test and arrows. It reads and writes PICT files compatible with SuperPaint, MacDraw II and Canvas.

Zedcor
List: $119

#3454 DeskPaint/Draw ..$112

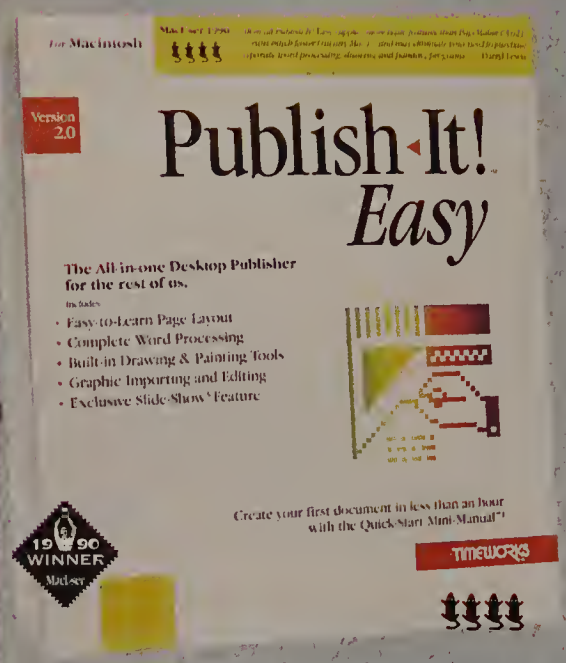
1990 WINNER

Multi Ad Creator or Search

MacUser says, "If you create ads, get it."The top-rated desktop publishing program. Why? Power, speed, precision, spot or process color separations and much, much more. The high-end choice for making great ads – or great pages – fast. Latest version adds custom PostScript effects, gradient fills and even more text-handling power. Multi-Ad Search is an image cataloging and retrieval system. It enables user to search for images cataloged in a common database without concern for where the images are stored. Once found the image can be previewed, printed or copied. File type of PICT, RIFF, TIFF, EPSF, and MacPaint are supported.

Multi-Ad Services, Inc.

#0053 Multi-Ad Creator $455
#0054 Multi-Ad Search $115



Publish It! Easy 2.0

Publish It! Easy is the all-in-one desktop publisher that combines page layout, word processing (complete with thesaurus and spell checker) built-in drawing and painting tools and a slide-show in a simple, easy-to-learn package. A Quick-Start Mini-Manual will help even beginners produce professional-looking documents within the first hour. Dynamic text flow reformats text when you adjust the size of text frames. Zoomable palettes disappear when screen space is needed. Multiple undo levels let you remove changes up to five steps back. Thumbnails let you see and edit the entire page.

Timeworks List: $250

#3798 Publish It Easy $143

FrameMaker 2.1

FrameMaker is a powerful, WYSIWYG publishing package designed for creating professional-looking business and technical documents of any length. It combines full-featured word processing, graphics, page layout, equations editing and book building tools into one integrated package. Features include: publication-quality typography, font sizes from 4 to 400 points, mixed page orientations, zoom capability, cross referencing and footnotes, FrameMath equation editor, spot color separation, spell checking and hyphenation control.

Frame Technology List: $995

#3582 FrameMaker 2.1.....$795

PixelPaint Professional 2.0

PixelPaint Professional Is the first application specifically written to take advantage of Apple's new 32-bit QuickDraw software. It's designed to grow with you when you upgrade your hardware. In its most powerful mode, PixelPaint Pro provides a palette of nearly 16.8 million colors at once (if your video card and monitor can display them). It includes all the features of PixelPaint 2.0 such as the PMS color selection, dithering and the ability to make color separations. PixelPaint pro offers features that are impossible in 8-bit color, such as anti-aliasing for smooth edges, transparency control and a realistic airbrush and color mixer. It saves in most popular file formats, including EPS and TIFF and runs on the MacII family as well as the SE/30.

SuperMac List: $695

#2665 PixelPaint Professional 2.0 .....$458

Swivel 3D

Swivel 3D is a three-dimensional color drawing/modeling program. It is intended for graphic artists, engineers and designers to create complex models for use in presentations, desktop publishing and schematic designs. Features include: a linked database with constraints that allow a user to lock the objects' relative movement and orientation; Z buffering, which solves object intersections and a full range of rendering commands, such as shadowing, projecting images and setting light sources.

Paracomp, Inc.

#2650 Swivel 3D $294
#3619 Swivel 3D Pro $434

PixelPaint 2.1

A wide variety of tools gives you outstanding design flexibility. Use lines, arcs, polygons, splines and fractal lines to create freehand shapes. Or choose airbrush, line drawing, oil painting or watercolor palettes to create artwork in any style. Use smearing, blending, smoothing, washing and shading techniques with any tool. Get smooth, continuous color without banding. Customize the shape and function of tools, and use masking techniques like friskets to design quickly and accurately.

SuperMac List: $249

#1576 PixelPaint ..$148

The Mac Zone
Established 1986

MacDraft 2.1

A classic precision drawing and design program, MacDraft now features movable geometric drawing tools, palette, advanced text handling, support for PostScript output, layers (limited only by memory), on-line symbol libraries, 44 different scales, dimension lines, Bezier and spline curves, automatic area calculation, smoothing of freehand shapes and polygons, full Macintosh color support (16.8 million colors) and more! All this, combined with incredible ease of use, makes MacDraft the powerful, low-cost solution to your drawing and design needs. Runs on any MacPlus or higher with System 6.0.2 or later.

Innovative Data Design — List: $399

#0429 MacDraft 2.1 $278

Dreams 1.1

An excellent, cost-effective choice for those who need access to higher levels of power and precision. Dreams provides standard drawing tools as well as these expanded drawing capabilities: parallel line tools with merging of intersection, 15 line styles you can customize, 8 line weights, extend lines to intersection (or a reference line), glue and unglue (glue edges together, unglue objects into component edges), add and subtract objects to or from one another, trim tool, fillet tool, true associative dimensioning (automatically updates when object is resized), optional keyboard editing for precise resizing or moving. Runs on any MacPlus or higher with System 6.0.2 or later

Innovative Data Design — List: $599

#2015 Dreams 1.1 ..... $318

BluePrint 2.0

CAD for the technical professional.
BluePrint is a powerful 2D Computer Aided Design package. It offers high precision, speed, ease of use and reliability. Use BluePrint to design floor plans and landscapes, prepare technical illustrations, and draw everything from a motor to an electrical component to a block of skyscrapers with perfect precision. With BluePrint you get it all: quality, speed and price.

Blueprint — List: $295

#3289 BluePrint 2.0 ..... $218

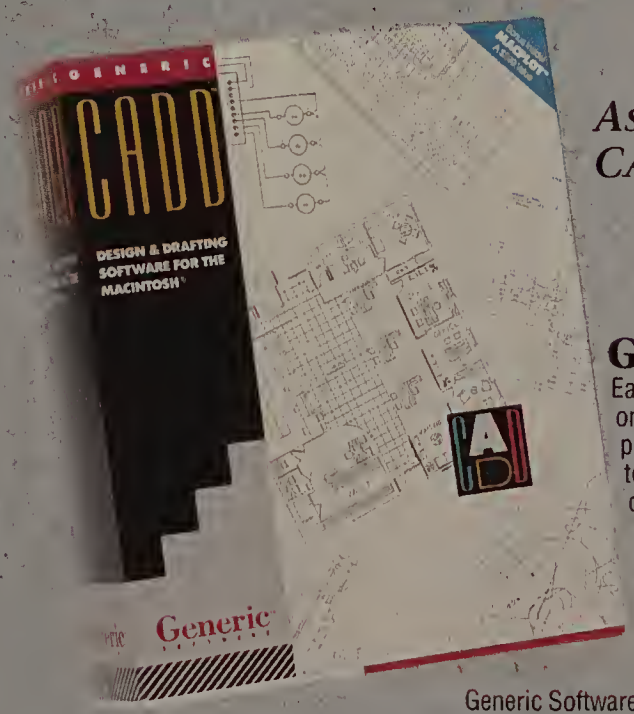
MiniCad 3.1

MiniCad+ is a product that integrates a spreadsheet and a relational database into a drawing so you can keep track of costs as the design evolves. Database information linked to a particular object stays with that object even when it is cut and pasted into another drawing. MiniCad+ also has a built-in programming language and a "smart cursor" to aid in the finer points of drafting.

Graphsoft — List: $795

#3540 MiniCad 3.1 ..... $585

Your Choice $64



Ask about our Generic CADD upgrade

Generic CADD

Easy from start to finish. Generic CADD is the only program that goes the distance in professional design and drafting work. Use it to sketch your first ideas then stay with it to create complete, fully-accurate drawings. Only Generic CADD offers the accuracy and precision it takes to produce sophisticated technical designs and drawings adequate for construction purposes. Start to finish, it provides top performance for the bottom line.

Generic Software — List: $595

#3679 Generic CADD $374

Design Your Own Home

Whether you're a novice or professional, you can now design your own home with these three programs: Architecture, Interiors and Landscape. Architectural Design enables you to draw floor plans, side view building plans and structural details in a fraction of the time it takes to draw by hand. With Interior Design you can arrange furnishings in your floor plan, explore color schemes and make changes often and easily. Use Landscape Design to create full-color plans for your property by experimenting with flowers, shrubs, trees, walkways, steps, fences and more. All include dozens of sample plans.

Abracadata — List: $100 each

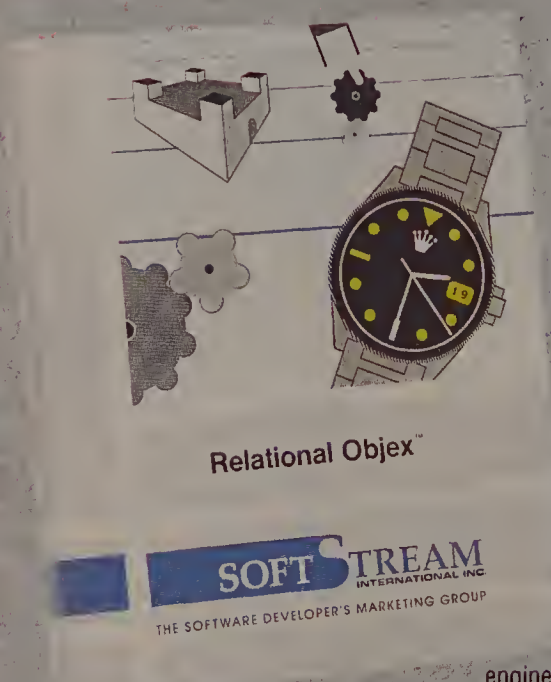
#3609 Design Architect $64
#3610 Design Landscape $64
#3611 Design Interiors $64

The Mac Zone
Established 1986

DRAFTING & CAD

1•800•248•0800

$3 Overnight Shipping via Airborne Express

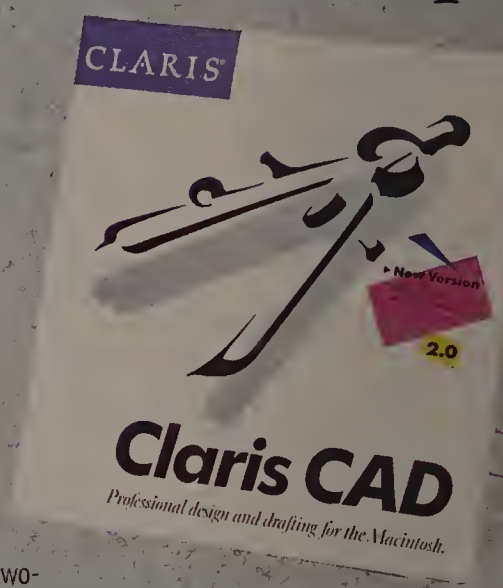


Relational Objex

Relational Objex can help educators create animated drawings to illustrate the principles and mechanics of mathematics or physics. Managers can plot Gantt charts with dependencies between tasks, which update automatically. Electrical engineers can check system timing in digital circuit designs. Mechanical engineers can simulate mechanical movement. Artists can create animated color drawings with point and click simplicity.

SoftStream — List: $240

#3468 Relational Objex $148



Claris CAD 2.0

Claris CAD is the professional design and drafting tool for engineers and architects. It integrates a wealth of two-dimensional design and drafting features, including mouse/keyboard entry, construction of fillets, tangents and perpendiculars and automatic dimensioning, while fully utilizing the Macintosh interface. Version 2.0 includes a new interface Graphic Guide, which intelligently guides you, anticipating the next steps and locating and indicating key geometric points on screen. You then simply point and click for precise alignment and placement.

Claris — List: $899

#3693 Claris CAD $644

FONTS & CLIP ART

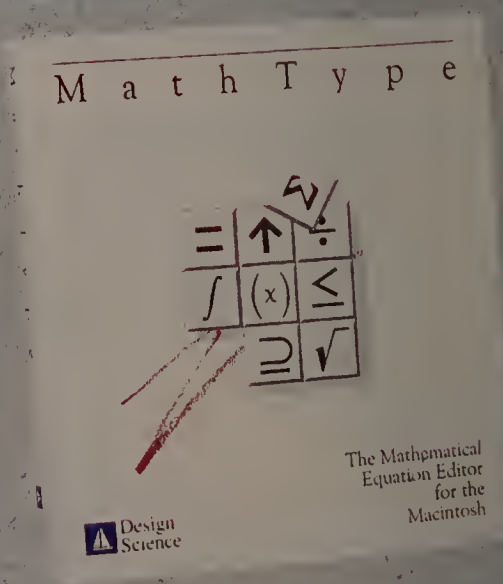
New Low Price Shipping Soon!

Adobe Type on Call

Type On Call offers over 800 Adobe Type 1 fonts on a single CD-ROM in a new accessible format. Get new fonts with a simple phone call to the MacZone. Simply by purchasing access codes over the phone, type users can obtain new fonts from the Adobe Type Library. Initial purchase entitles you to two free fonts of your choice and includes Adobe Type Manager 2.0. Type on Call is the quickest and easiest way to buy fonts—once you have the disc, every font is a simple phone call away!

Adobe — List: $99

#3950 Adobe Type on Call $47



MathType

If you need an easy way to create technical reports, slides, class notes, research papers, or even entire books, then MathType is your tool. It's an intelligent equation editor that lets you build complete equations with simple point-and-click techniques, then paste them into your word processing documents. Creating an equation couldn't be easier—you just click on templates and symbols in the on-screen palettes then type into the empty slots.

Design Science — List: $149

#3559 MathType $88

Call Us for Everyday Low Prices

The Mac Zone
Established 1986

Get Adobe Type Free!

Choose the CD-ROM Adobe type solution from NEC and get authentic Adobe type and a CD-ROM reader

Choose the CD-ROM Adobe type solution that gives you your first three typeface families free, as well as the lowest combined CD-ROM reader-type library cost. And other important advantages.

Now you can buy the best Adobe type solution on CD-ROM. You'll get NEC's Type Gallery PS Locked Version and the amazing NEC Intersect CDR-36 CD-ROM reader. You can choose any three typeface families (up to a maximum of 15 individual typefaces) from more than 1000 Adobe typefaces on the disk. Plus, you'll save an average of 48% every time you call NEC in the future to unlock additional families.

NEC List: $1,098

#0077

NEC Type Gallery PS w/CDR-36 ..... $475

Hurry! Quantities are limited at this price.

Other NEC Products Available

#0082 PhotoGallery ..... Zone price $245
#0081 Image Gallery ..... Zone price $245
#0085 Clip Art 3-D ..... Zone price $245
#0076 Intersect CDR-36
Battery pack ..... Zone price $95

NEC

You'll get a quality NEC portable CD-ROM reader, authentic Adobe typefaces, (up to 1000 that you'll be able to purchase and unlock with a simple call to the MacZone), a 250 page type catalog and technical support for the reader and fonts.

NEC Intersect CDR-73

NEC's CDR-73 external reader is rated among the highest performance CD-ROM readers currently available with averge access time of 300 milliseconds and data transfer rate of 150 KB/second. This makes the Intersect reader one of the fastest ways to access data from CD-ROM applications.

NEC List: $999

#0079 Intersect CDR-73 ..... $659

The Mac Zone
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Cliptures
The professional's choice in PostScript art

Save the cost and hassle of creating custom artwork from scratch. Cliptures puts a wealth of useful ready-to-use EPS (Encapsulated PostScript) illustrations right at your fingertips! Enlarge, reduce, stretch or skew them: Cliptures graphics are flexible and easy to use. They look great when printed at 300–or up to 3300 dpi, and can even be modified or have color added with either FreeHand or Illustrator. Cliptures works with any program that accepts EPS files. A PostScript compatible printer, or interpreter program is recommended for best results.

Dream Maker Software

Volume 1: Business Images

Features 148 terrific business illustrations including a wide selection of male and female executives and a variety of tantalizing business cartoons, graphics and symbols. Perfect for newsletters, memos, presentations.

Volume 1 — List: $130

#3998 ..... $67

Volume 3: Sports

Puts 228 fantastic sports images at your fingertips. Men and women athletes, a rich collection of outstanding sports graphics, symbols and icons. Includes backgrounds and mortise designs to create unique emblems and logos.

Volume 3 — List: $130

#4000 ..... $67

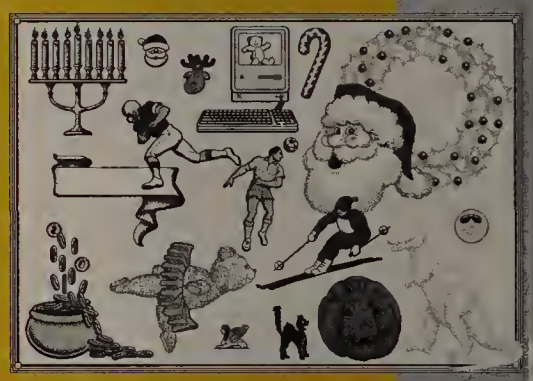
Volume 2: Business Images 2

Adds 206 powerful business illustrations of men and women at work plus people silhouettes, business cartoons, aircraft, money, telephones and lots of computers. An idea assortment for business and office publications.

Volume 2 — List: $130

#3999 ..... $67

MacGallery
The ideal choice for fun, easy-to-use clip art!



Tantalizing collection gives you well over 400 ready-to-use bit map images. This broad assortment of light-hearted artwork is just right for holiday greeting cards, special occasions, fliers, memoirs, stationery, business cards, newsletters and other projects. Includes a bonus collection of great looking border art. Available in MacPaint file (works with any paint program) or HyperCard stack format. Perfect for ImageWriter users!

MacGallery — List: $50 each

#3995MacPaint file $26
#3996HyperCard Stack $26

Fluent Laser Font Library 4.0

The Library includes 79 PostScript typefaces, ATM compatible, Type 1. John Dvorak once recommended these same fonts for an Eddy award! The purchaser is entitled to a 6-month free subscription to *Publish* Magazine. No one else has this kind of variety and style at such an affordable price. (This collection previously sold separately in 21 volumes for $89.95 per volume.)

Casady & Greene, Inc. — List: $179

#0315 Laser Fonts $99

FONTS & CLIP ART

1•800•248•0800

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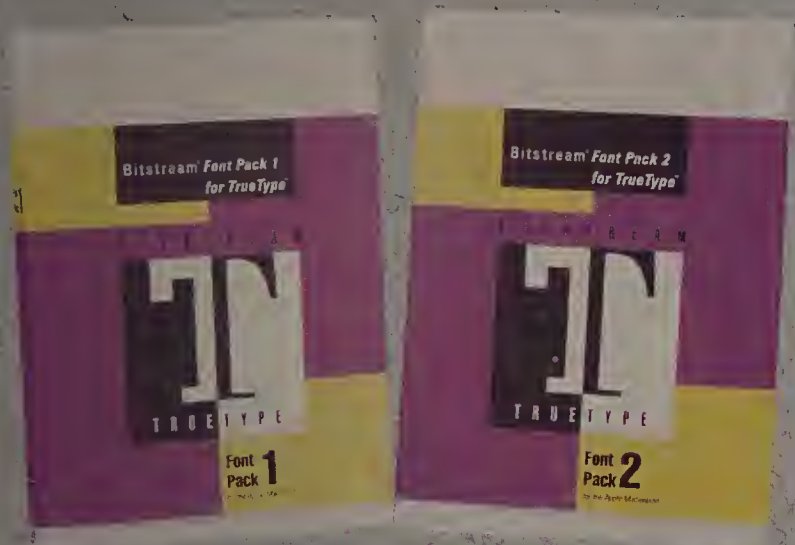
Established 1986

Our knowledgeable MacAdvisors will help you order the best product and version for you.

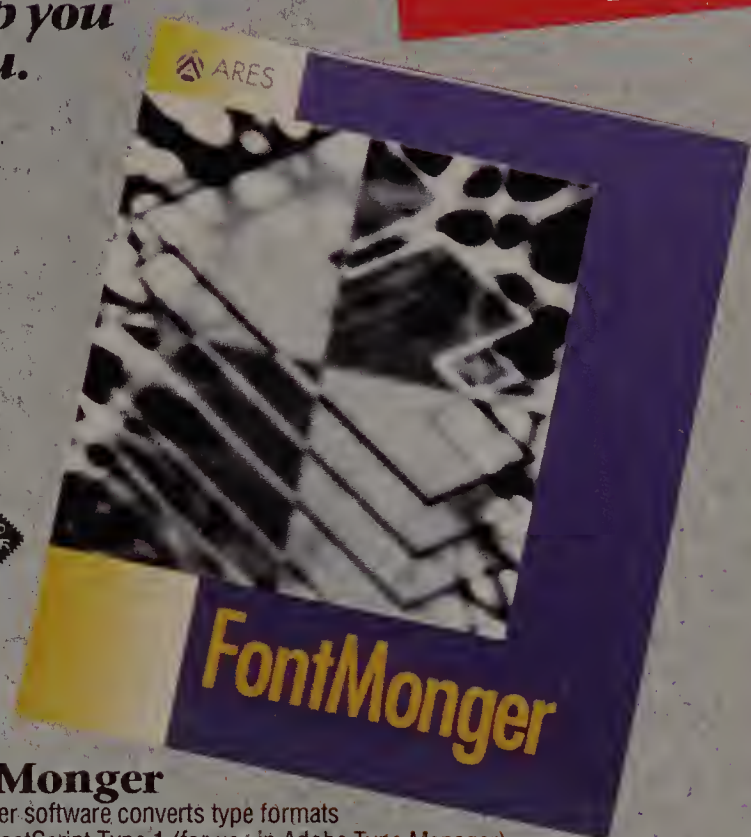


Bitstream Font Pack 1 & 2–TrueType

These Font Packs provide the highest quality type for the latest font technology. Each Font Pack contains seven typefaces to use with any printer or operating system incorporating TrueType technology to be included in Apple's new System 7. You get four styles of a text face plus three dynamic decorative fonts. Only Bistream Font Packs give you seven great fonts that take advantage of TrueType today.

Bitstream List: $89

#0396 Font Pack 1 ..... $58
#0397 Font Pack 2 ..... $58



FontMonger

FontMonger software converts type formats between PostScript Type 1 (for use in Adobe Type Manager), Type 3 and True Type (for system 7.0). It also provides complete Adobe Illustrator and Aldus Freehand support for True Type, since all your converted fonts can be imported or exported as EPS files. You can even generate customized typefaces and characters such as obliques, fractions and small caps, or merge characters from different typefaces to form a new typeface.

ARES Software Corp. List: $100

#0078 FontMonger $62

Clipart Business Images

Business Images includes over 160 high-quality ready-to-use PostScript clip art graphics. You can have professional quality artwork to enhance your business publications, newsletters, brochures, advertisements, memos or any printed piece. This package includes images most requested from professional artists including: people, computers, equipment, symbols, hands, phrases, backgrounds and much more.

On Line Arts List: $129

#0178 Clipart $79

Versatile New Art for Industry, Healthcare, Sports & MORE!

4 New with Great Products!

3G GRAPHICS IMAGES WITH Impact!

EPS FORMAT

PEOPLE 1

If you're looking for superbly drawn ethnic women and men in diverse occupations and livelihoods, then 3G's latest offering is ideal for you. You'll get up to **1,000 graphics** by ungrouping and separating them in compatible draw programs. Categories include: **Business** (some humorous), **Industry** (with 75 occupational symbols), **Healthcare** (hospital and clinical settings), **Fitness, Sports** and **Arts & Entertainment.**

#0421 ..$99

Award-Winning Art at Your Fingertips!

1990 WINNER MacUser

BEST DATA RESOURCE

ACCENTS & BORDERS 1

Creative borders, designer sets, labels, symbols of food, holidays, people and more.

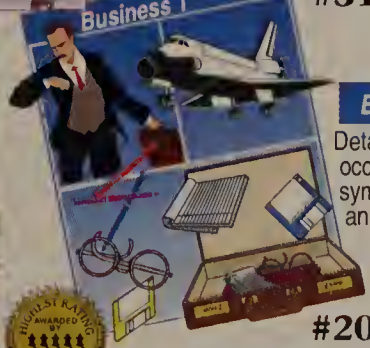
Registered users receive a FREE color disk!

#3192 ..... $64

GRAPHICS & SYMBOLS 1

Useful topics include people, cartoons, food, travel, symbols and frames.

#1617 ..$49



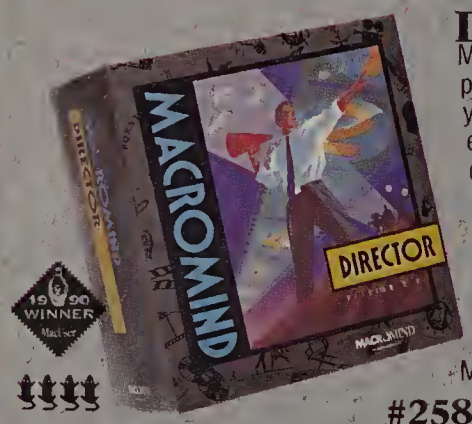
BUSINESS 1

Detailed art of computers, occupational and public symbols, people, phrases and more.

#2085 ..... $64

© 1991 3G Graphics, Inc. All rights reserved

3G Graphics, Inc., 11410 N.E. 124th St., #6155-Z
Kirkland, WA 98034 (206) 367-9321



MacroMind Director V2.0

MacroMind Director 2.0 is the multimedia presentation and animation tool that helps you communicate with greater impact than ever before. Director allows you to easily create and integrate graphics, text and animations, then import sound and add a full range of interactive control. MacroMind Director is a powerful system for live presentations, visualizations, video productions and interactive training.

MacroMind, Inc. List $895

#2583 Director V2.0 .... $628

FREE Photosho Limited while supplies last with purchase

ComputerEyes

Computer Eyes captures video images and converts them to digitized graphics files. It accepts any standard NTSC video signal from camera, camcorders, VCRs (Beta VHS or 8mm), videodisc, the new still frame video cameras and more. Software saves files in PICT and TIFF color formats, black and white TIFF, PICT MacPaint and EOS formats. With a 24-bit color video card and monitor, it also works with the 32-bit QuickDraw format. Can adjust brightness, contrast, hue and saturation before or after capturing the image. Imagine the impact your projects will have when you can place color or B&W photos in your next desktop presentation.

Digital Vision List: $249

#3278 Computer Eyes B&W .. $194

List: $450

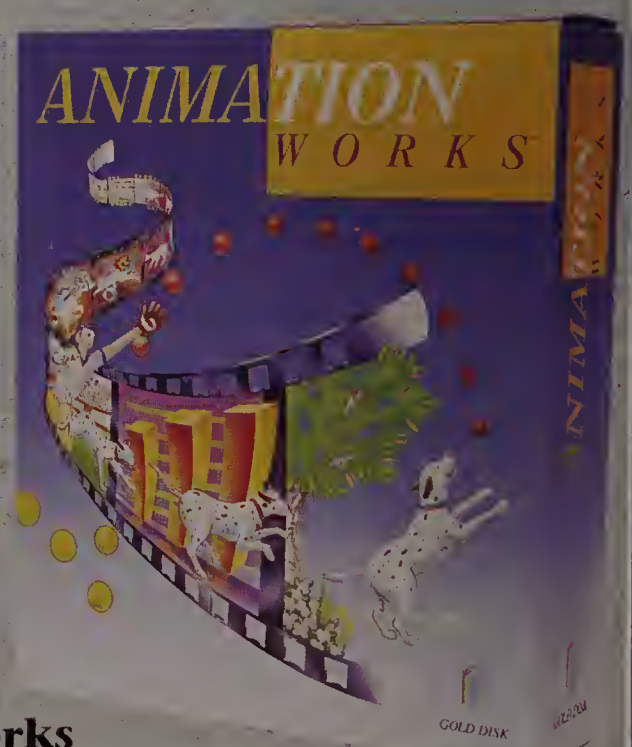
#3277 Computer Eyes Color $348

QuickImage 24 Video Frame Grabber

The QuickImage 24 Video Frame Grabber captures 24 bit color or 8 bit gray scale images from full motion video. It fits in a single NuBus slot and does auto switching between NTSC and PAL signals. It accepts standard Composite and S-VHS input signals. A live preview window lets the user select the exact image desired. A Photoshop plug-in allows users to capture images directly into Adobe Photoshop. It saves images as Pict2, Tiff or Tiff Compressed for desktop publishing, presentation or video projects. It captures at 1/30th or 1/60th of a second for fast-moving images. QuickImage 24 is display independent and will work with any Mac II system: 24 bit color, 8 bit color or gray scale. Now with PhotoShop Limited while supplies last.

Mass Micro Systems List: $995

#0180 QuickImage 24 ..... $699



FilmMaker

The Eddy Award winning FilmMaker is the masterful animation and multimedia graphics program. This amazing application allows the user to create professional quality presentations and animations quickly and easily! What takes hours to create in other applications can now be done in just minutes with FilmMaker. If you're a professional animator who wants to create stunning effects for video, or just someone who wants to put their ideas in motion, FilmMaker is the ultimate answer.

Paracomp List: $695

#3850 FilmMaker $434

Animation Works

A fantastically creative program allowing the easy way to animate, create and present. An animation package that allows you to combine graphics, text and sound into colorful, high-impact movies! Ideal for education and sales presentations, simulations, storyboard, video titling and video production. Comes with FREE instructional video.

Gold Disk List: $200

#3974 Animation Works $122

Sargon 4

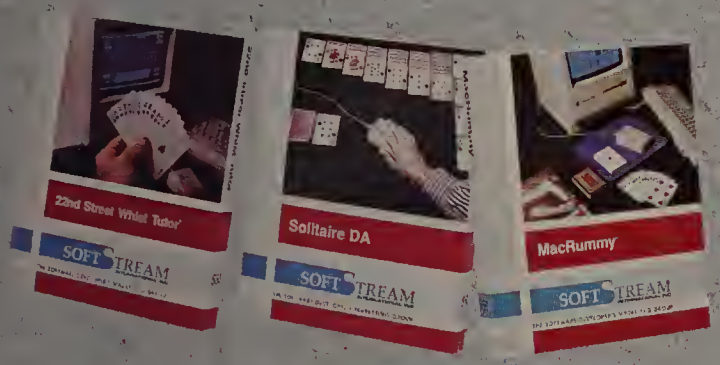
"I am Sargon and I challenge YOU to world class chess like you've never seen before!" Sargon was the warlord who ruled the ancient world. Patient, cunning, a master strategist...he has inspired this fourth generation chess program. Now Sargon 4, the software, is at your command to challenge, coach and entertain you.
Spinnaker List: $50

#1916 Sargon 4 ..... $27

Sky Shadow 1.09

Shoot-em-up Arcade Action! Save your people from an attack from the dreaded Razoropers with your white-knuckled bombing raids over enemy territory. At 100,000 points watch your heart rate! You'll enter Mega mode with double game speed, scoring power and action—like swatting your way out of a swarm of bees! 500K digitized sound and 16-color landscape. Game Hall of Fame 1990 *Macworld*.
Casady & Greene, Inc. List: $50

#3462 Sky Shadow $28



22nd Street Whist Tutor, Solitaire DA, MacRummy

22nd Street Whist, perfect for your computer: straight forward and challenging. Includes tutorial. Solitaire is a high-power DA to play any time. A great stress reliever! MacRummy, play it straight or play Gin–keeps track of your scores.
Softstream List: $50 (each)

#0441 Whist $31
#0261 Solitaire DA $23
#0255 MacRummy $32

Nemesis Games

Go combines Japanese philosophy and business strategy into their national game. Go Master Deluxe, winner of the Chaos Manor Users Coide Aware (*Byte* 1990), unites the Go playing and teaching abilities of Go Master, the corner-opening tutorial Joeski Genius, and the life and death consultant, Tactical Wizard.
Toyogo

List: $50
#0191 Go Master Junior ... $20
List: $70
#2892 Go Master $41
List: $169
#3580 Nemesis Deluxe $84

Electronic Arts Presents:

King's Bounty

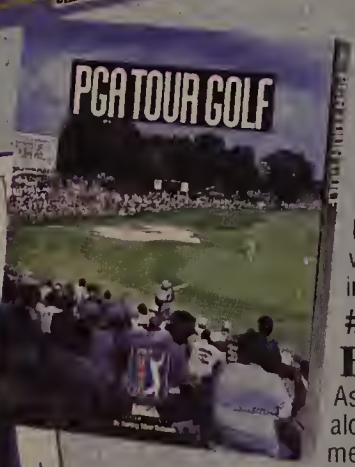
You have conquered all the dungeons and monsters flee at the mention of your name. Now you wish to retire. But a band of unscrupulous monster criminals has stolen Noble King's Sceptre, and you are the only one who can return it. List: $50

#0474 King's Bounty $32

Loom

A fantasy adventure set in the mythical Age of Great Guilds. Features a revolutionary new interface which relies on icons and music instead of text. Includes a 30-minute stereo cassette to set up the story.
List: $50

#0307 Loom $29



PGA Tour Golf

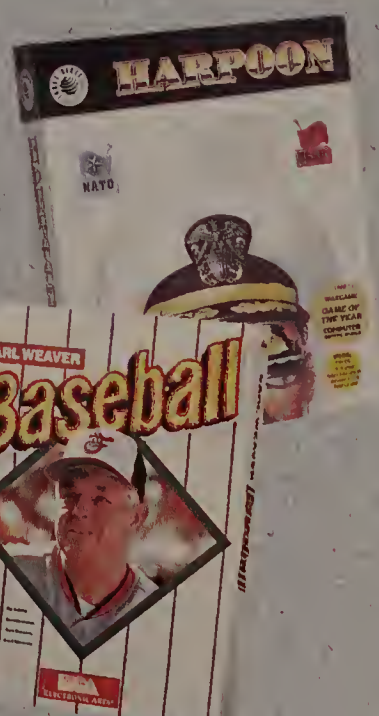
Tee off against 60 top PGA Tour pros in real tournaments on actual Tournament Players Club courses. Stunning color or B&W graphics with TV-style coverage. Fast animations and accurate ball play. List: $50

#0473 Golf $38

World Atlas

Bring the globe to your computer screen. World atlas, almanac and world fact book, with instant access to over 240 fully detailed, EGA/VGA color maps and database of international information. List: $50

#3589 World Atlas $38



Harpoon

As Commander of NATO's North Atlantic Naval Task Force, with a devastating arsenal of weaponry, you alone must face the Soviet battle fleet. Mastermind tactics and strategies. Stimulates and challenges like no mere game can do. List: $50

#3600 Harpoon $39

Earl Weaver Baseball System

Real major league action. More stats than the Sunday Sports page. Camera angles rivaling network TV. Puts history's most winning manager in the dugout. Play and/or manage with real player stats. Manage your own team. Four skill levels. List: $50

#3602 Weaver Baseball $33

The Mac Zone
Established 1986

ENTERTAINMENT

1•800•248•0800

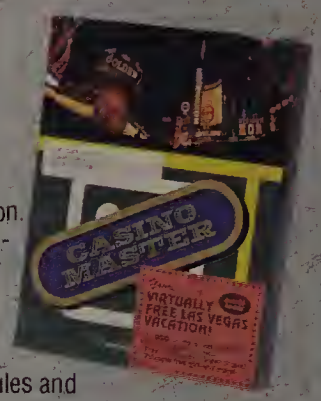
RoboSport

RoboSport is a computerized battle-strategy simulation game. It combines the tactical challenge of chess with the intensity of guerilla warfare to provide total strategic mayhem. Armed with bombs, bullets, missiles, grenades and more, you control teams of Robots that compete in five different sports: Survival, Treasure Hunt, Capture the Flag, Hostage and Baseball. Plan your tactics, instruct your troops and kick Robutt!

Brøderbund Software — List: $60

#0145 RoboSport ...$37

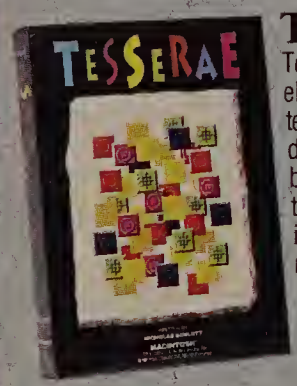
Casino Master



Feel the suspense-filled action of casino gambling with Casino Master. Learn and practice at your own pace without risk. Go from game to game with a keystroke or mouse click. Place bets and watch the action. Player-selectable stake and chip value. Pop-up windows with odds and betting hints. Long term storage of wins and losses. Includes Craps Master, Roulette Master, Blackjack Ace, Poker Master and Baccarat Master with complete manuals including rules and betting strategies. Not copy protected.

Centron Software — List: $89

#2471 Casino Master B&W ...$40
#2470 Casino Master Color...$44



Tessaræ

Tessaræ is a color puzzle game in which the player eliminates tiles from a "board" according to color and texture. When only one tile remains on the board, a different, more difficult arrangement appears. For the beginner the object of the game is to remove as many tiles as possible. The more advanced player tries to improve his high score by using the fewest possible moves. The player can choose Beginner, Intermediate, or Advanced play.

Inline Design — List: $50

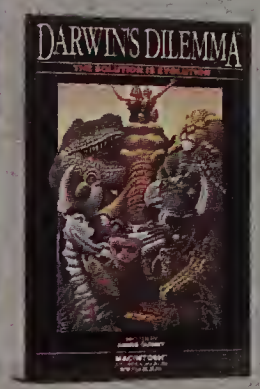
#3934 Tessaræ $31

OIDS

Rescue the OIDS from the fiendish Biocretes who are turning them into vending machines and household appliances! Create your own games with the OIDS Construction set. Design your own planetoids and puzzles in minutes with simple cut-and-paste operations. It's easy! Make new games for yourself or trade them with friends.

FTL Games — List: $45

#0240 OIDS $29

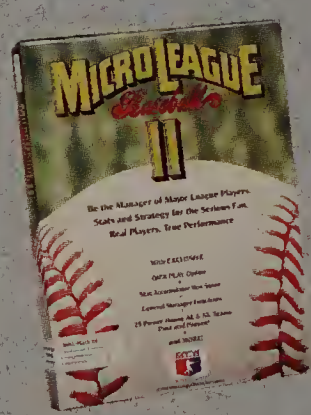


Darwin's Dilemma

Loosely based on the ideas of evolution, Darwin's Dilemma is a captivating strategy game in living color. The player moves up through the levels of the game by colliding and merging icons that represent increasingly complex life forms. Each level brings new creatures and a more difficult puzzle to solve. Like a classic board game, Darwin's Dilemma is easy to play but tough to master and highly addictive.

Inline Design — List: $50

#3494 Darwin's Dilemma ...$31



MicroLeague Baseball II

MicroLeague Baseball II offers authentic performances featuring real-life players and accurate stats. You boss actual major leaguers by setting up and changing lineups, picking your spots for pinch hitters and relievers, deciding when the players will steal, bunt or do a pitchout—in short, make every managerial maneuver in every game. More than just a game simulation!

MicroLeague Sports — List: $60

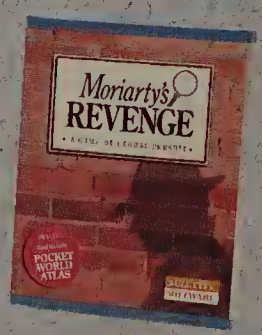
#2923 MicroLeague Baseball II $37

Moriarty's Revenge

The infamous Dr. Moriarty is now leader of a world-wide crime organization and you must track him down. You'll travel the world, taking notes, puzzling over clues and trying to stay alive. Over 1,000 clues and a computerized notebook to keep them in. With varying levels of difficulty, it's never the same game twice.

Mysterium Tremendum — List: $60

#3290 Moriarty's Revenge....$31

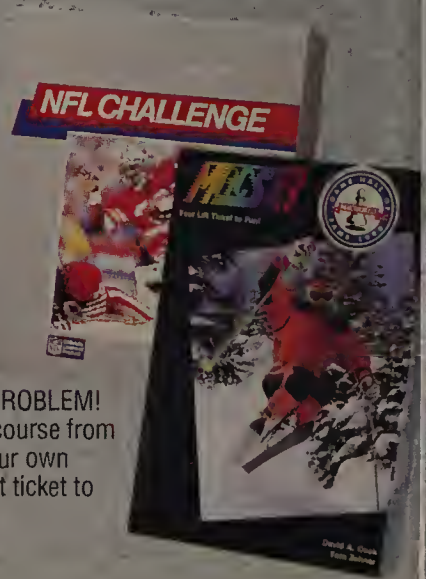


NFL Challenge

NFL Challenge is the most authentic, realistic football game ever created for computers. Features: all 28 NFL teams, computer coaching, two levels of difficulty, animated play action with slow-motion instant replay.

XOR Corporation — List: $100

#0895 NFL Challenge $53



MacSki

No Snow? No Equipment? No Time? NO PROBLEM! MacSki brings the slopes to you. Select a course from a number of challenging runs or design your own using the Course Editor. MacSki is your lift ticket to FUN. Hit The Slopes!

XOR Corporation — List: $69

#3625 MacSki.....$37

Citadel with Secrets

Your quest is to free the Lady Synd cruelly imprisoned by the Evil Wizard. You'll experience knockout sound and graphics as you create your own heroes, encounter might and magic, and engage in realistic combat. Also enjoy Citadel Secrets–more than just a hint book–a fascinating story telling one explorer's wanderings through depths of the Citadel.

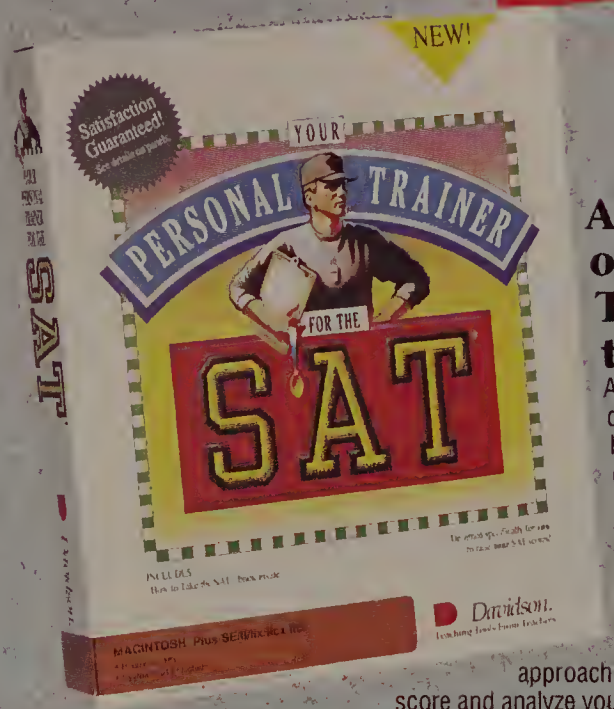
Postcraft International — List: $50

#3129 Citadel $26
#3402 Secrets Book.....$14
#3480 Citadel w/Secrets $37

The Mac Zone
Established 1986

Earthquest

The ultimate learning game. Gain knowledge of our land, water, air and life. Walk through history from 7000 BC to the present. Learn about vital problems and solutions. Help save our environment by taking some of the 101 steps included. View fun and educational animated moves and much much more.
Earthquest, Inc. List: $80
#3661 Earthquest $48

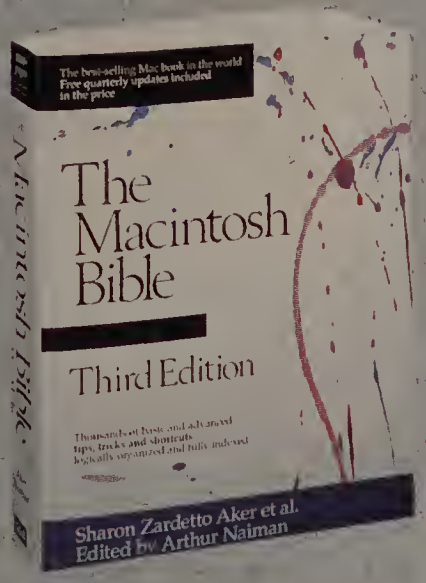


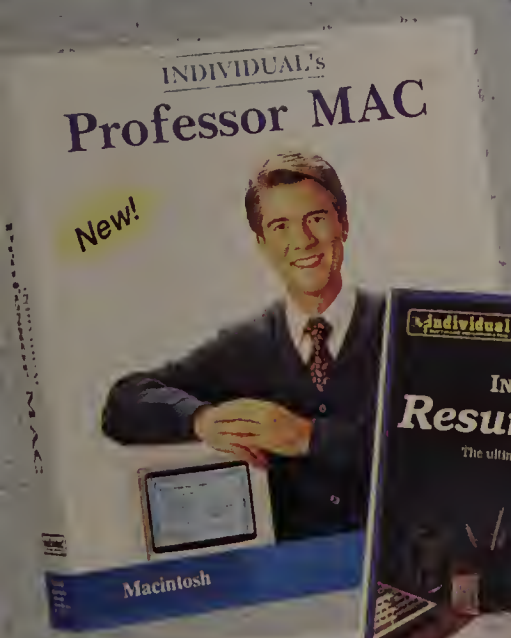
Alge-Blaster or Personal Trainer for the SAT

Alge-Blaster contains five different activities and hundreds of algebraic equations and covers material found in both 1st and 2nd semester algebra. Learn how to solve algebraic problems using a step-by-step, interactive tutorial approach. Personal Trainer will score and analyze your performance on sample math and verbal SATs. Prepare up to six detailed training programs to help you raise your score.
Davidson & Associates
#3847 Personal Trainer for the SAT $35
#3838 Alge-Blaster $35

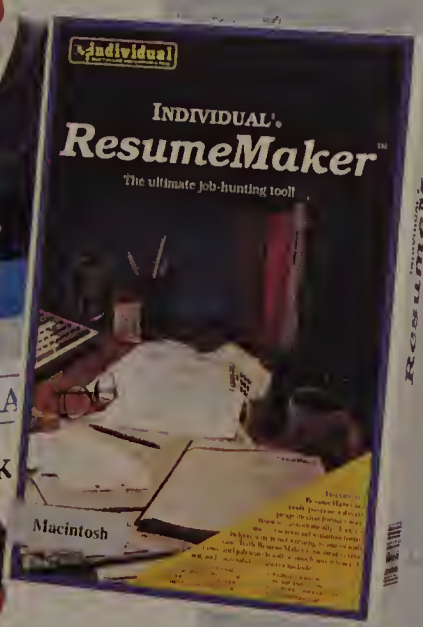
Macintosh Bible, Third Edition

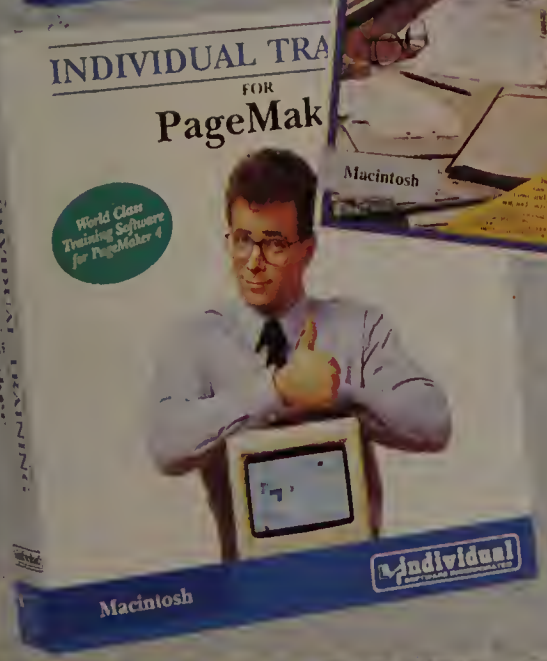
The newly revised Third Edition of the Macintosh Bible contains thousands of hints and tips on using the Macintosh. It explains all those mysterious, undocumented, Option and Command key combinations that perform special tricks for you. It contains over 1,000 tips, tricks and shortcuts in 1,024 pages. For newcomers, it's an indispensable source, for experienced users, a handy reference.
Goldstein & Blair List: $28
#3814 MacBible $19





Also available:
Individual Training for Word $38
Typing Instructor Encore $17
Power Macros-Excel $28
101 Scripts/Buttons $28





Individual Software

Professor Mac

Professor Mac is your personal tutor on proper use of your computer. He'll take you through all the basics with an introductory tutorial that starts where Apple's guided tour left off. The self-paced lessons use an interactive Q&A format to guide you through. Quizzes help you evaluate your progress.
Individual Software List: $50
#3998 Professor Mac $29

Individual's ResumeMaker

Individual's ResumeMaker helps you quickly get on the right track for the job you want. It's easy to use: simply fill in on-screen information forms with your experience, education and skills. It then automatically transforms this into a winning, professional-looking resume. Includes varied resume formats, Guided Letters, a full word processor, target company database and much more.
Individual Software List: $50
#0431 ResumeMaker $30

Typing Instructor Encore

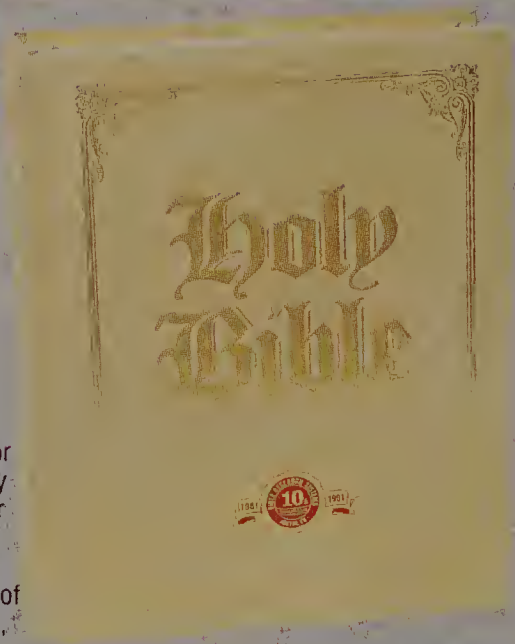
Typing Instructor Encore's 300 pages of exercises and tests can help build your speed and accuracy. It's the only program that features "off by one" space correction, advanced diagnostics to chart your progress and optional Type 'n' Discover disks to expand your knowledge as you type.
Individual Software List: $25
#3759 Typing Instructor Encore ...$17

Individual Training for PageMaker 4.0

Individual Training teaches users how to take full advantage of Microsoft Word's array of features through step-by-step on-screen lesson and exercises. The program allows users to progress at their own pace. Users will learn document and file concepts, use of fonts, sizes and formats; page set-up and printing, utilizing section options, and creating style sheets. Includes spell checking and hyphenation, creating an index and table of contents, making and using tables and footnotes, and using print merge, creating custom menus, preferences and learning tricks of the trade. The program is capable of running side-by-side with Microsoft Word, using MultiFinder, and letting users practice new skills as they are learned.
Individual Software, Inc. List: $70
Individual Training for PageMaker 4.0.....$29

The Mac Zone
Established 1986

EDUCATION
1•800•248•0800

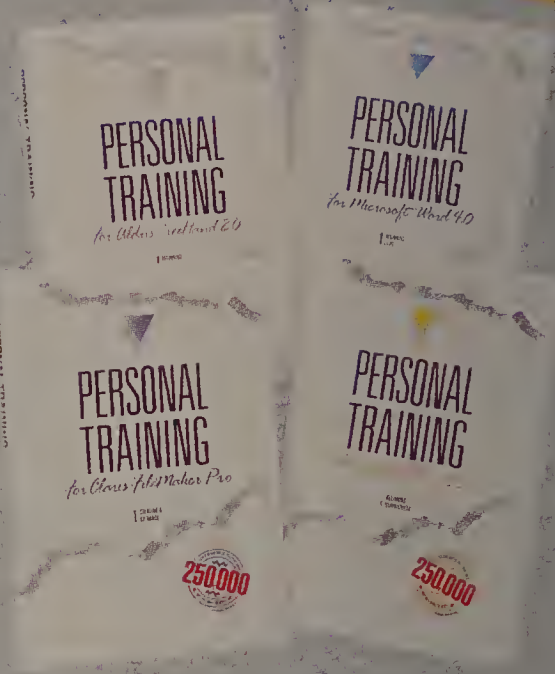


THE WORD Processor 5.0

Find any verse in the Bible instantly! Search for any word, or phrase or even for concepts using a built-in thesaurus. Easily find the exact verse you need. Create your own Bible cross-reference lists that permanently store your personal studies. Print any portion of Bible text. Select one of the four Bible translations (NIV, KJV, NKJ, RSV). 10th Anniversary Edition.

Bible Research Systems (each) List: $195

#0186 THE WORD KJV $145
#0187 THE WORD NIV $145
#0188 THE WORD NKJ $145
#0189 THE WORD RSV $145



Personal Training Systems Tutorials

Personal Training Systems Tutorials are just like having your own private tutor. The Tutorials are interactive, which means you work on your Macintosh using the real program as the instructors talk you through step by step. These audio-based tutorials are self-paced and modular, allowing you to receive training at the most suitable level: beginning, intermediate or advanced. Each module is reusable, takes about 90 minutes to complete, and includes an audio cassette, example files on disk, and a quick reference card. All Tutorials are unconditionally guaranteed.

Personal Training Systems List: $80

See Index for Complete Listings . $51

Number Munchers

Munch your way to math mastery! Endless hours of basic math fun. With the Munchers' help, you'll learn basic math skills the fun and exciting way. It mixes amusing graphics and sounds with practical math skills. Hundreds of different game boards ensures each game will always be new and exciting. As you attain more advanced math skills and want more challenge, you can change the difficulty levels of the game.

MECC List: $50

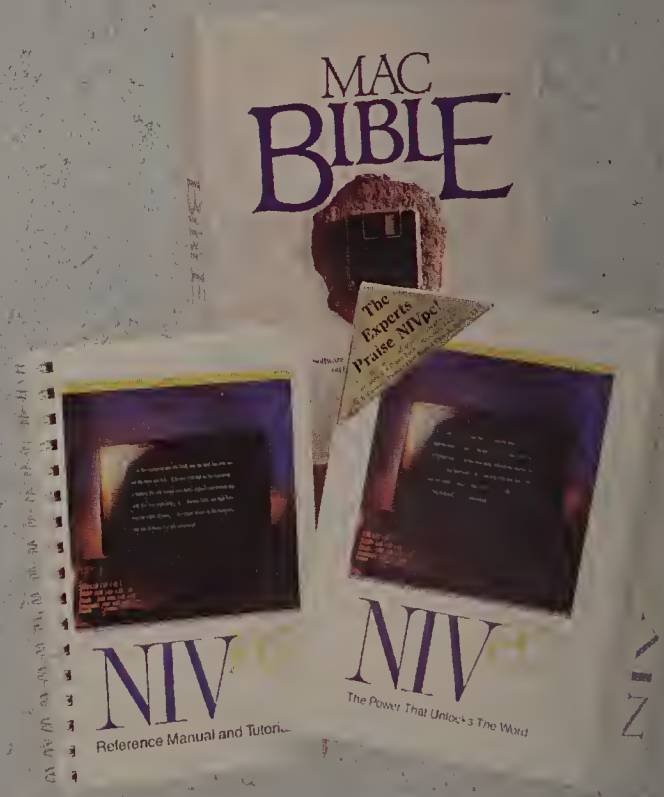
#0072 Number Munchers ... $28

The Oregon Trail

Players load up their gear and hit the trail with other pioneers in this realistic, award-winning learning simulation. While experiencing life of the American frontier along the 2,000 mile route, players will talk with colorful characters, navigate rushing rivers and meet friendly Indians. They'll also learn to think fast and shoot straight when wild game crosses their paths!

MECC List: $50

#0074 The Oregon Trail $28



macBible

ZonderVan macBible presents several different versions of the Bible to help you understand its meaning more clearly. It quickly finds the passage you want. It can ope five text windows and one special purpose window at once. Three study modes open Bible to your questions. The Word-and-Phrase mode locates individual words, phrase and groups of words. The Verse mode displays any range of verses by book, chapter verse. The Count mode displays statistical information about words or groups of word to complete your study.

ZonderVan Electronic Publishing List $100

#0021 Greek $98
#0023 Hebrew $98
#0016 NIV $58
#0017 KJV $58
#0018 RSV $58

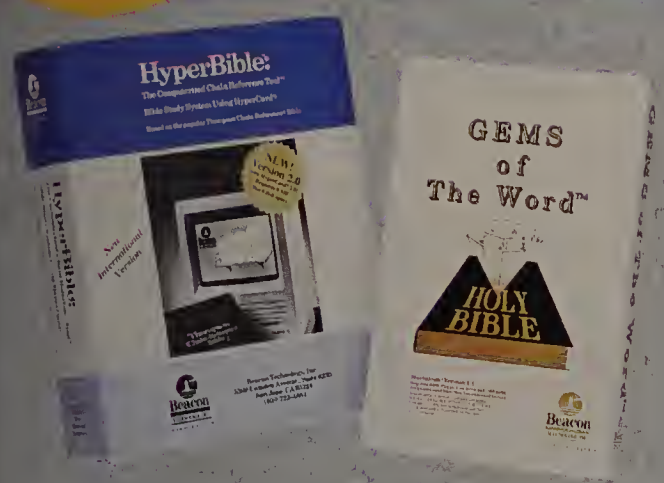
Interactive Physics

The easy to use, yet surprisingly powerful physics laboratory on a computer. Masses include: circles, squares, rectangles and free-form polygons. Adjustable friction, elasticity, size, mass,and velocity. Constraint objects include: springs, dampers, ropes and constant forces, each fully adjustable. Gravity and air resistance are variable. Measurement devices include numerical readout, analog display and graphing capabilitiees for 16 different physical properties. Animated arrows can be used to represent vector quantities. Endless possibilities. FUN.

Knowledge Revolution List: $249

#0260 Interactive Physics $188

The Mac Zone
Established 1986



HyperBible 2.0 KJV

This Computerized Chain Reference Tool is a computerized adaption of the popular Thompson Chain-Reference Bible with many of its features, including: cross-referencing of over 100,000 topics, preselected topics for Bible studies, general index of over 7,000 topics and names, archaeology information, Harmony of the Gospels, outline studies of each book of the Bible, character studies, and more. Version 2.0 includes full Boolean search capabilities, multiple windows and HyperCard 2.0

Beacon Technology, Inc. List: $199

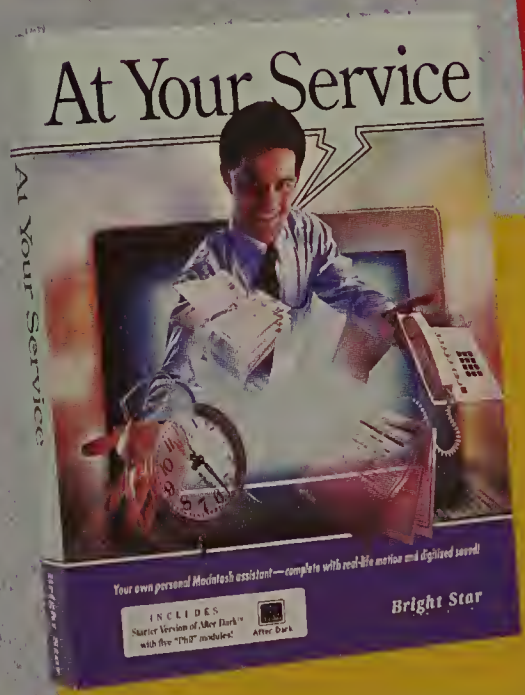
#0247 HyperBible 2.0 KJV $124

Gems of the World KJV

Gems of the Word is a collection of over 2,000 of the most popular and useful passages of the Bible, organized by contemporary topic. Over 150 topics provided and easily accessed. It includes a DA that allows it to be run from within any program. Startup program "Gem of the Day" displays a new passage each day based on your topic of interest. Printing and text export via the clipboard are included.

Beacon Technology, Inc. List: $40

#0246 Gems of the World $25



At Your Service

Add a friendly, polite assistant to your Macintosh, with real-life motion and digitized sound. Phil will notify you of important meetings, prompt you when phone calls need to be made and remind you when deadlines approach. He'll alert you when E-mail arrives, provide a report on your computer's memory usage and system and monitor keyboard and mouse activity to suggest when you need a break.

Bright Star Technology

#0415 At Your Service $30

Talking Tiles

Talking Tiles uses Bright Star's HyperAnimator to teach reading. The animated mouth motions synchronized with highlighted letters demonstrate the relationship between spoken sounds and written symbols. Old timers will remember this method of teaching reading as "phonics." Its advantage over the "look and say" method is that readers know how to sound out words they don't know by shape or form. Talking Tiles is useful from preschool to adult literacy.

Bright Star Technology List: $50

#1941 Talking Tiles $25

Alphabet Blocks

Alphabet Blocks teaches reading skills with an interactive talking elf. The entertaining animated character asks questions and responds to answers. When the elf speaks, his mouth changes to show how the sound is made, thus teaching phonics and letter names. The elf adapts his questions to the learner's responses, guides him or her to the right answer, and tracks progress. Parent's manual included.

Bright Star Technology List: $60

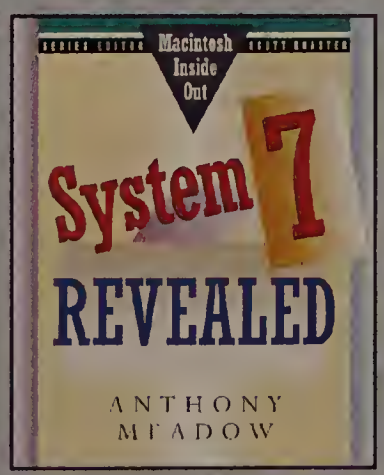
#1614 Alphabet Blocks $29

Kid Pix

Kid Pix is an amazing paint program created just for kids. It combines special effect art tools, picture stamps, sounds and magic screen transformations to turn the computer into a magical art studio. With Kid Pix, you don't just paint a masterpiece, you hear it too! Every brush and tool has its own unique sound effect. You can even record greetings, poems or music to enhance your creations.

Brøderbund List: $50

#3994 Kid Pix $29



System 7.0 Revealed

Written by Macintosh authority, Anthony Meadow, System 7.0 Revealed offers programmers a first look at System 7's many new features and shows how to take full advantage of these features in developing Macintosh software. Other books in the acclaimed Macintosh Inside Out Series and the Apple Technical Library, including Inside Macintosh Volume VI, can be found in the index.

Addison-Wesley

#0250 System 7.0 .....$18

Word Torture 4.0

Foreign language software for Macintosh computers with a hard disk drive, HyperCard 2.0 and system 6.0.5 or higher. Automated vocabulary drill. Over 1400 verbs, nouns, adjectives, adverbs, comparatives, and functions words and their translations. Drill from English to target language or vice versa. For students, travellers and anyone studying a foreign language who wants to review frequently used words or to create personal vocabulary lists.

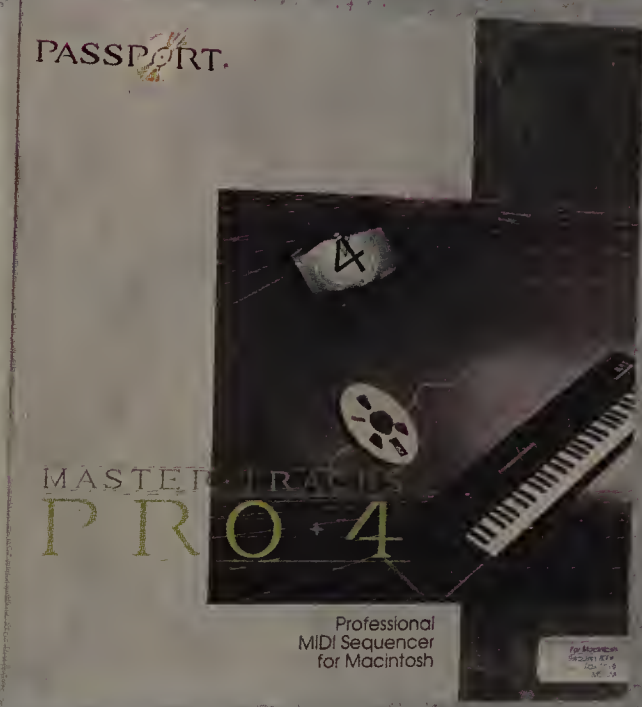
HyperGlot Software Co.

 # 3737 Word Torture: Spanish $34
 # 3741 Word Torture: French..$34
 # 3745 Word Torture: German $34
 # 3748 Word Torture: Italian..$34
 # 3732 Word Torture: Russian $34

Finale

Finale is designed to be the last music composing and publishing software you'll ever need. Finale understands music and music notation. Now you can compose, edit, transcribe, orchestrate and publish without using a pencil. Improvise a score on a MIDI keyboard and see it displayed on screen in standard music notation in seconds. All you need is the inspiration to write music. Finale does the rest.
Coda

#3127 Coda Finale $548



Master Tracks Pro 4.0

Master Tracks Pro 4 turns your Macintosh into a 64 track MIDI recording studio. The improved cut and paste Track Editor is easier to use and has graphic MIDI volume faders for each track. A new Event Editor displays editable data for each track. Master Tracks Pro 4 can sync to SMPTE time code (with external hardware) and even control MIDI lighting boards. Enter music by playing it on a MIDI instrument or use the Step Time Editor.
Passport Designs List: $495

#2828 Master Tracks ...$318

Practica Musica 2.2

One of *MacUser*'s "Best 200 products of 1989," Practica Musica is a music tutor that covers ear training and music theory—for both beginners and advanced students. Using either the Mac speaker or a MIDI instrument, it teaches you how to recognize and notate intervals, chords, melody and rhythm, identifies chords that you play, gives you practice in writing tunes by ear and much more. It will even invent a short melody in your choice of key, scale and meter! Includes coordinated textbook *Windows on Music*.
Ars Nova List: $125

#1479 PracticaMusica ...$68

EZ Vision

EZ Vision is an intuitive MIDI sequencer for recording, editing and playing back music with MIDI synthesizers. Equipped with familiar tape deck style controls and 16 tracks, it acts as a complete recording studio, allowing graphic editing, arrangement and mixing. EZ Vision is compatible with music notation programs, allowing printed scores.
Opcode Systems, Inc. List: $149

#3937 EZ Visions $99

MIDI Translator

The MIDI Translator interface attaches to either the modem or printer port on your Macintosh. It provides one MIDI In and three MIDI Outs that may be connected to any synthesizer, drum machine or other MIDI device using standard MIDI cables and requires no power supply.
Opcode Systems, Inc. List: $59

#3938 MIDI Translator .$42

MIDIplay

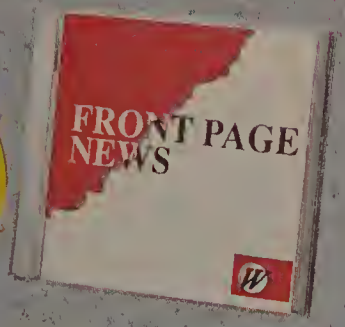
MIDIplay allows addition of MIDI-based music to HyperCard, SuperCard and MacroMind Director based multimedia presentations. It allows you to play a MIDI file and change the parameters of playback, even in real time.
Opcode Systems, Inc. List: $60

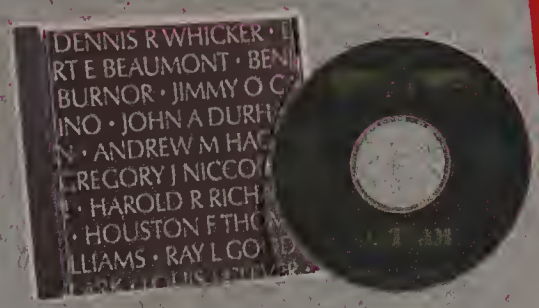
#3939 MIDIplay $42

WAYZATA TECHNOLOGY

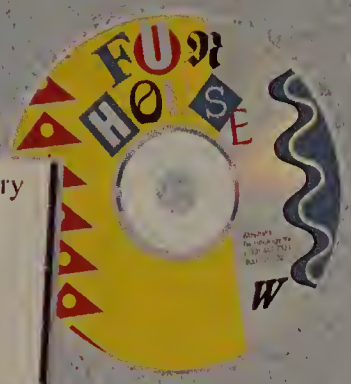
1•800•248•0800

The Mac Zone
Established 1986





Wayzata Technology Presents:



Quick Art 2.02

List: $299

#3504 Quick Art 2.02 ..... $174

U.S. Presidents 3.0

Contains biographies and statistics of the 41 U.S. Presidents. Includes many interesting historical and presidential facts.

List: $39

#0243 U.S. Presidents $25

The Korean War 3.03

Compiled by Quanta Press from public and private sources. Encompasses U.S. involvement in Korean conflict 1950-53.

Vietnam Remembered 3.02

Vast information compiled from public and private sources. Covers US involvement in S.E. Asia 1946-76; includes Vietnam Memorial listing.

List: $129

#3511 Vietnam Remembered $78

Front Page News 3.02

World-wide news at your fingertips! Full text of over 10 US and international wire services, news sources. Over 175,000 articles.

List: $149

#0472 Font Page News 3.02 ..... $89

The CD Fun House 2.61

Public domain collection of best shareware/freeware games available for the Macintosh. Includes movie style rating list.

List: $65

#3863 CD Fun House $39

Middle East Diary 3.02

Represents a review of Middle East history, personalities and conflicts. Includes State Dept. and CIA information, treaties in force, etc.

List: $139

#0025 Middle East Diary $85

Down to Earth! 1.00

Contains over 750 high resolution color and B&W PICT images ready to use. Range from illustrator line drawings to full grayscale scanned photos.

List: $249

#0244 Down to Earth $155

BBS in a Box from MacWizards 1.00

First CD ever produced for Macintosh BBS that provides over 7,000 compressed Macintosh files with BBS directories on 18 topics.

List: $119

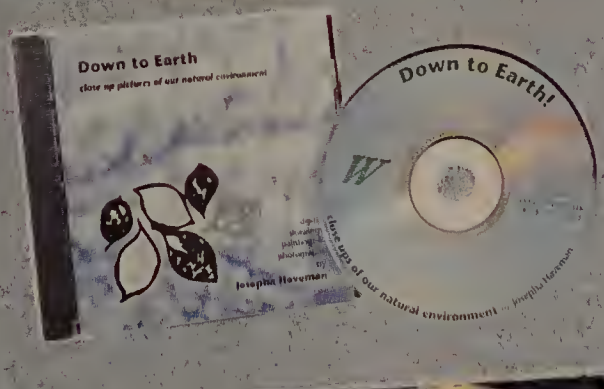
#0241 BBS $78

USA Factbook 1990 3.02

Electronic almanac of 50 States and territories. Published annually. Covers geography, vital statistics, government, politics, much more.

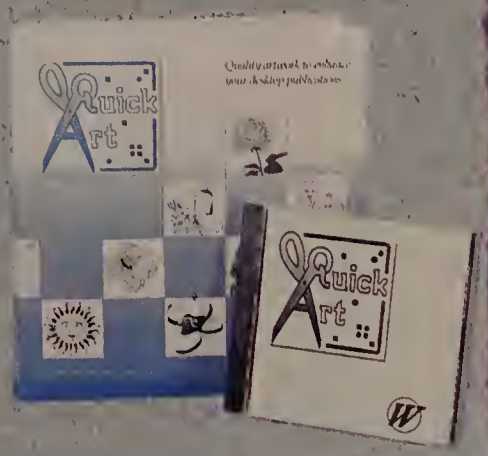
List: $139

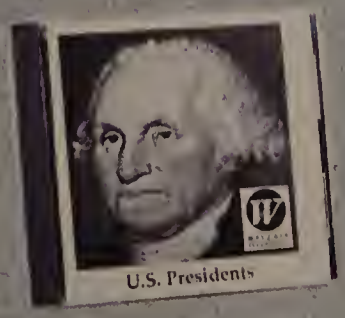
#3508 USA Factbook $85

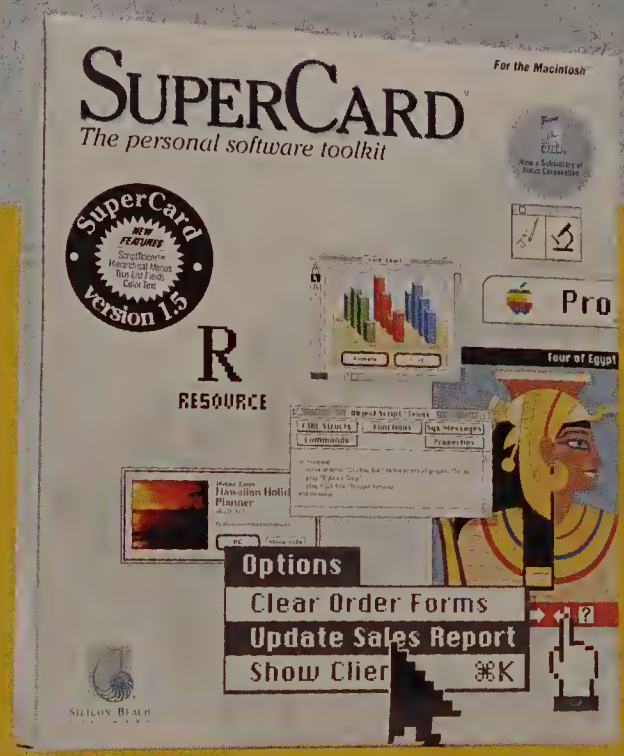


More titles to choose from!

#3510	The Sporting News–Baseball 3.02	$155
#3505	U.S. Seals 2.02	$55
#3507	Disc Tracy–Programmer's Detective 2.50	$85
#3506	All of MacTutor—Includes Articles 1-5 3.02	$155
#3512	GEM Macintosh 1.00	$75
#3509	CIA World Factbook CD	$78







SuperCard 1.5

SuperCard extends HyperCard. Just import your present HyperCard stacks and improve them with all the new capabilities of SuperCard. Or use SuperEdit to create your own stand-alone applications. New features include Script Tracer debugger, colored text, new animation, improved speed, polygon buttons and pop-up and hierarchical menus. SuperCard permits you to have multiple stacks and types of windows, resizable windows and color graphics. Any object can be a button with an attached script.

Silicon Beach — List $299

#3492 SuperCard 1.5 .....$198

ScriptExpert 1.0

ScriptExpert is push-button programming for HyperCard by Dan Schafer, the author of the best-selling book, *HyperTalk Programming*. ScriptExpert requires little or no programming experience. You can write grammatically correct scripts by pushing buttons and answering questions. ScriptExpert knows the rules for every command, function, property and message in HyperTalk. It lets you focus on your project because it remembers the syntax and structure of your scripts. ScriptExpert is the ideal companion for HyperCard training classes.

HyperPress — List $80

#3776 ScriptExpert 1.0 .....$44

Quantum Leap Technology Giga-Rom, Macademia, or CD7

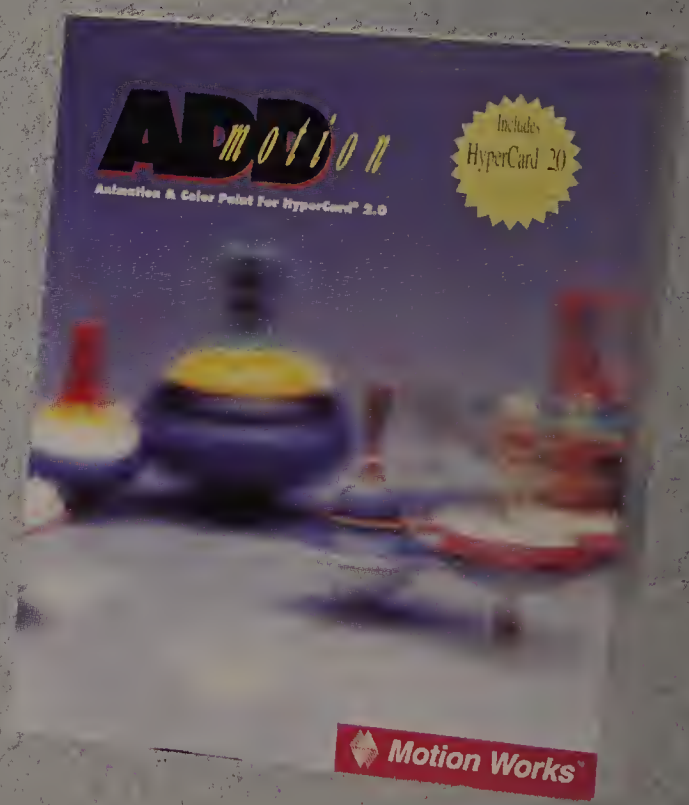
Giga-Rom is the largest collection of Macintosh software ever assembled. Files are archived in Bill Goodman's "Compactor" format and indexed with On Location. Macademia is 7,500 programs and related files for Education and Instructional use. Subject range from the arts to the sciences, CD7 is the largest non-compressed collection of Macintosh software with over 15,800 files including art, games, demos, and music files with digitized sounds.

Quantum Leap Technology — List $99

#0152 Giga-Rom $98

#0151 Macademia $73

#0150 CD7 .....$49



ADDMotion

ADDMotion is the first animation and color paint program to be fully integrated with HyperCard 2.0. With ADDMotion you can quickly and easily add animation, color and sound to any HyperCard stack. It can be used by anyone who wants to create exciting presentations, develop interactive training systems, or simply have fun. ADD Motion includes HyperCard 2.0.

Motion Works — LIST $295

#3985 ADDMotion $182

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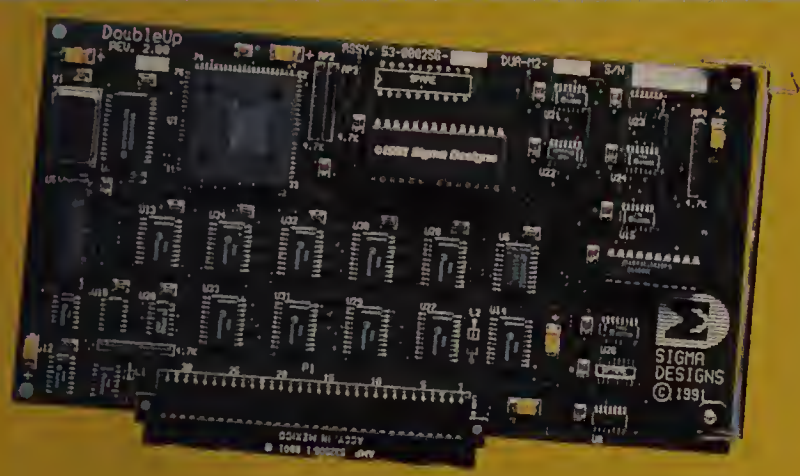

Sigma Double-Up Board

Double your disk capacity with DoubleUp from Sigma Designs. DoubleUp compresses any data, image or application file – so fast you'll hardly notice it happening. You *will* notice your disk capacity expand, by 100% or even more. It's like doubling the number of hard drives in your system. DoubleUp comes with DiskDoubler software for user-friendly operations, and a Macintosh NuBus card for unbeatable speed. So you can work with files the way you usually do, even after they're compressed. And data is never lost or altered.

Sigma List $229

#0215 Double-Up Board $167

Mass Microsystems DataPak Removable Hard Drives

Voted the best by the industry critics, it's still the first family of removable cartridge drives for the Macintosh. With 45 megabytes on each removable All Mass Microsystems drive products come bundled with Disk Doubler from Salient.

#0175 Single 45 MB Removable $724
#0176 IIC 45 MB Removable $778
#0177 MO 512 Optical Read/Write $3,424
#0164 DataCartridge MO for Optical $208

45 MB Removable Hard Drive

They are not just for backup anymore! At 20 milliseconds average access speed this high performance drive is faster than most fixed drives. When you need additional storage, simply add another cartridge. Imagine sending a cartridge overnight or taking one home instead of an entire drive. Independently fused AC outlets, eliminating power surge damage, two EMI filtered AC outlets for single switch power up, a push button SCSI ID selector and a louvered chassis reducing noise levels by 50%. Performance, flexibility and security.

Cutting Edge List $995

#0253 Removable ... $589

Cutting Edge External 40mb Hard Disk Drives

Cutting Edge hard disk drives plug directly into your Mac's SCSI port and are preformatted so they're ready to use right out of the box. Many major enhancements to the new series make them still easier to use and more functional than before. All external drives now have dual 50-pin SCSI connectors so you can easily connect several devices together in your SCSI chain. Two power outlets, dual fuse circuitry and a fuse access latch add more user convenience. The newly-improved manual tells you exactly what you need to know to get the most out of your Cutting Edge drive. A quieter fan makes it a more pleasant desktop companion. All Cutting Edge drives are now subject to a 24-hour burn-in test and come with the manufacturer's one-year warranty.

Cutting Edge LIST $749

#3299 45 Mb External $438

800K External Floppy Drive

This is the perfect solution for anyone who is still swapping disks or lugging a hard drive between office and home. It utilizes proven Fujitsu technology for quiet, reliable performance. It is so quiet that we've installed an LED indicator light that signals when the disk is working. Small, very compact, and simple to install and use, the 800K external floppy disk drive is an ideal and necessary peripheral for you Macintosh. You'll wonder how you ever got along without it.

Cutting Edge List $229

#0253 800K Drive $125

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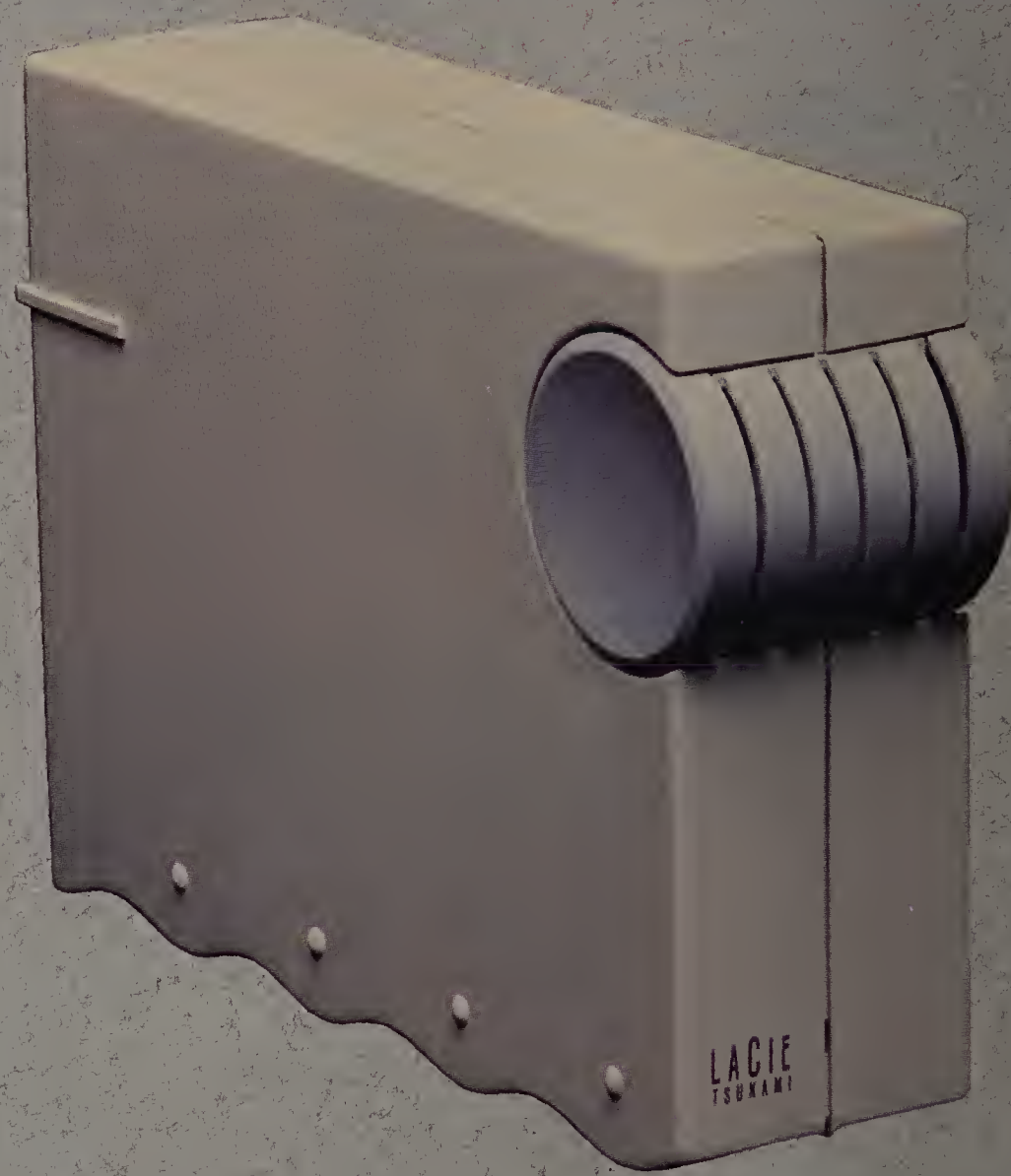
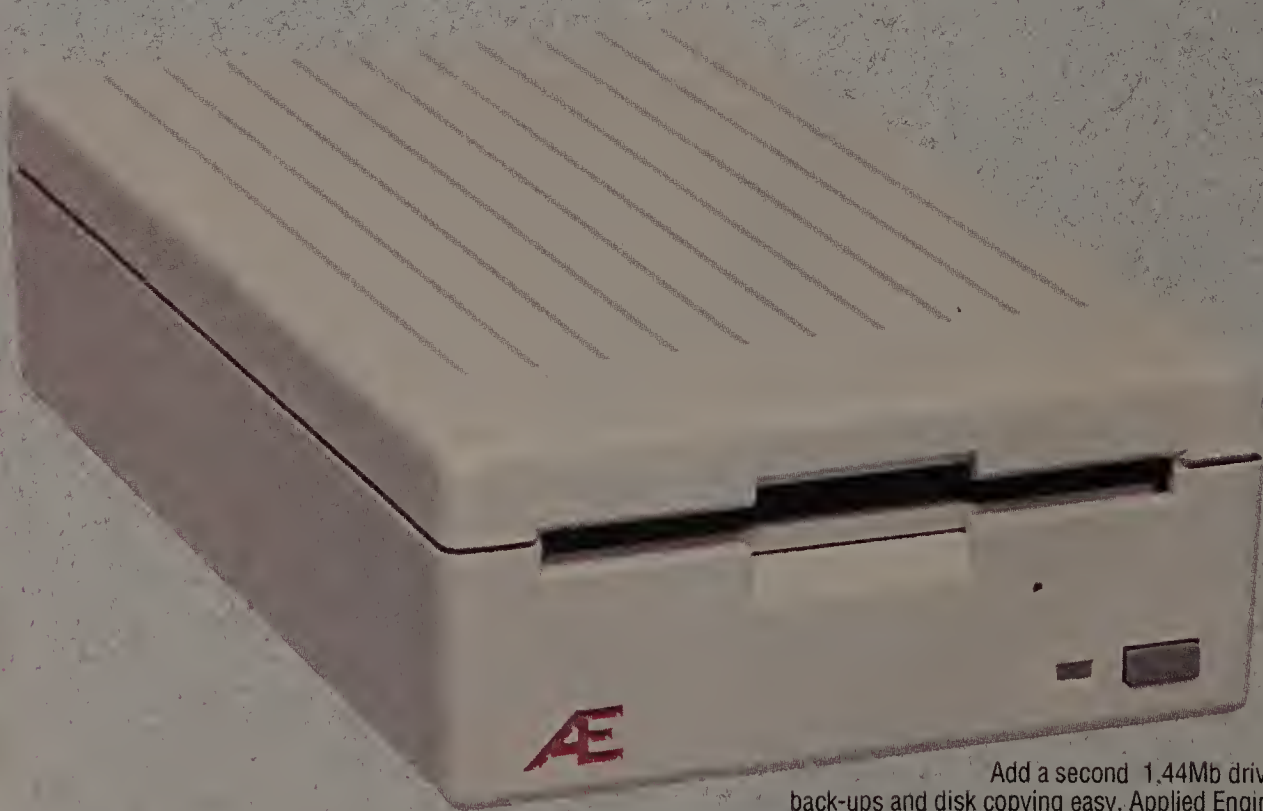


LaCie Tsunami QLPS 50 MB Hard Drive

Tsunami drives come initialized with SilverLining, the standard of hard disk utility software, and SilverPlatter. Apple's system, five megabytes of public domain software and Norton Utilities are also included on the drive. LaCie features a warranty of 5 years on the Tsunami drive.

LaCie List $699

#3948 Tsunami QLPS $599



Applied Engineering 800K Drive

The AB 3.5 Drive offers all the reliability and performance of Apple's 3.5" drive. It incorporates the same top-quality Sony mechanism that Apple uses, along with a thick ABS case to stack with and exactly match the color and footprint of Apple's drive. The drive's two-way LED indicator shows green for reading and red for writing. The drive also features auto-eject, complete daisy chaining capacity and a full one-year warranty.

Applied Engineering List: $289

#3671 800K Drive $195

3.5" High Density Floppy Drive

Add a second 1.44Mb drive to any SuperDrive-equipped Macintosh and make back-ups and disk copying easy. Applied Engineering's 3.5 external high-density drive looks and performs like Apple's but costs much less. The drive incorporates the same high quality Sony mechanism Apple uses and features auto-eject, MS-DOS compatibility, and *AE*'s exclusive two-color read/write indicator light.

Applied Engineering List $339

#3672 High density Drive $228

The Mac Zone
Established 1986

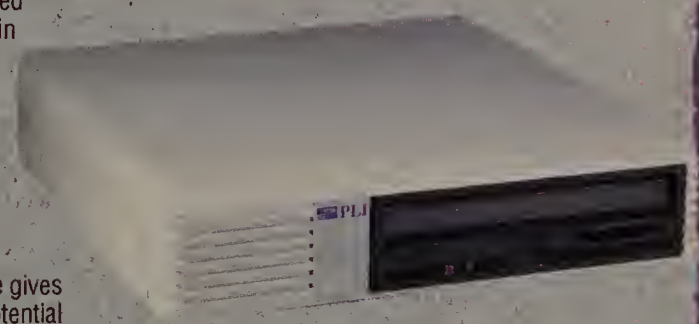
PLI CD-ROM With Adobe Type-On Call

The PLI CD-ROM is the most fully-featured drive available. It has a self-cleaning objective lens, eliminating bothersome dust problems. It offers audio output through a 1/8" headphone jack and two RCA jacks. Volume control for the headphones is provided by a convenient dial on the front panel. PLI software is compatible with virtually every CD-ROM drive on the market, and supports all of the HyperCard audio XCMDs. It also allows channel control on those drives which support it. Get a free copy of Adobe Type-On-Call with PLI CD-ROM purchase, while the supplies last.

PLI — LIST $1,099

#3691 CD-ROM w/Type on Call $775

PLI Infinity 40 Turbo REM HD



The Infinity 40 Turbo uses PLI's turbocharged driver software to attain a 20ms access time. With the TurboCache disk accelerator software and TurboBoost, you can achieve near zero effective average access times. This removable 45Mb drive gives you infinite storage potential with removable cartridges. Each one holds 44Mb and costs only slightly more per megabyte than floppy disks.

PLI — List $1,399

#2181 Removable Hard Drive $748

PLI Turbo 600 External HardDrive

600Mb 5.25" CDC drive. Access time of 16.5 milliseconds and MTBF of 100,000 hours. Turbo 600 comes with Turbo Cash, Turbo Back, Turbo Spool and Turbo Optimizer.

PLI — List $3,999

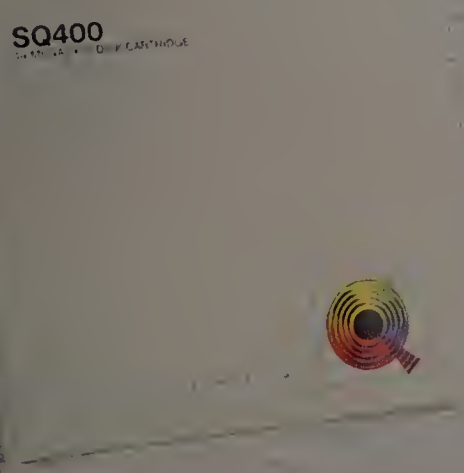
#3281 600 Mb Hard Drive $2,959

Turbo Floppy 1.44 Mb Drive

The Turbo Floppy from PLI is an innovative new disk drive that combines the benefits of SCSI performance with the latest advances in floppy disk technology. The Turbo Floppy Drive is the first high-speed 1.44 MB floppy disk drive to offer all Macs an upgrade path to high-density formatting.

PLI — LIST $395

#2298 Turbo Floppy Drive $308



Sy'Quest Removable Cartridge

The Sy'Quest Removable Cartridge features low cost and high volume data storage. It is dependable and easy to use with unlimited storage. Sy'Quest is great for color scanning, data storage, and all kinds of back-up storage.

Sy'Quest — List $109

#2183 44 Mb Cartridge ... $74

Lexus Turbo 2400 BPS Mini Modem

Intelligent, compact 2400 baud modem. Fully compatible with Hayes AT command set. Easy to install and ready-to-use, all cables included. All the features you need in a modem, including auto answer, auto dial and advanced diagnostics for error checking. Eight front panel LED lights let you know what the modem is doing. Compatible with all major communications software. Comes complete with everything you need to get started, including MacKnowledge 1.02 MZ communications software, special introductory membership to CompuServe and Genie.

Lexus Turbo — List $199

#0028 Mini Modem $95

Clipper Compact Hard Drive

The new ultra compact Clipper from IDS delivers powerful portability in a tiny package. Measuring 1" x 3" x 5", the Clipper weighs just 10 ozs, fits easily into a shirt pocket or briefcase, and plugs directly into the back of any Macintosh computer. Features fast 20 ns access speed, convenient auto termination, rugged 100g shock rating and a 2-year warranty.

IDS — List $499

#0144 Clipper $428

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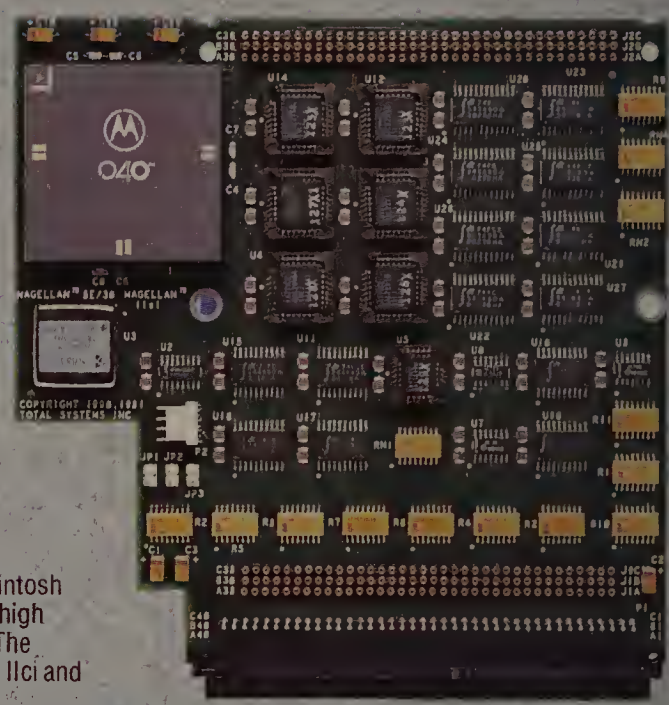
TOTAL SYSTEMS

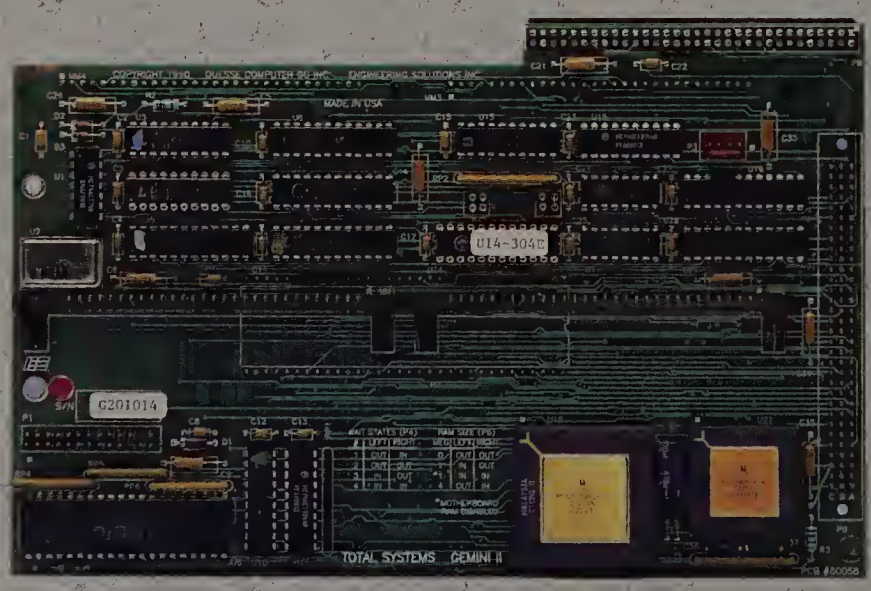
ACCELERATOR & UPGRADE BOARDS

Place your orders now for upgrades for System 7.0



Magellan 040 Accelerator system

The Magellan series of Advanced High Performance Accelerators for the Apple Macintosh computer family is designed to augment the Macintosh host platform CPU with the high performance 32-bit integrated CPU/FPU/PMMU engine of the Motorola MC68040. The supported Apple platforms include the Macintosh SE/30, Macintosh IIsi, Macintosh IIci and Macintosh IIfx.



Gemini II

Gemini II transforms your Mac 128, 512, Plus or SE into a IIci-stomper. Snap applications open, pop open even the largest documents, and zap graphics around the screen. Low-cost display options turn porthole glimpses into dual-page vistas--at irresistible prices. Virtual™ is free! Installation is easy. You can even use your existing 256K and 1MB SIMMs! Plugs into SE slot; requires Gemini Plus Kit for Plus and earlier.

Magellan 25 mhz 040 w/PMMU

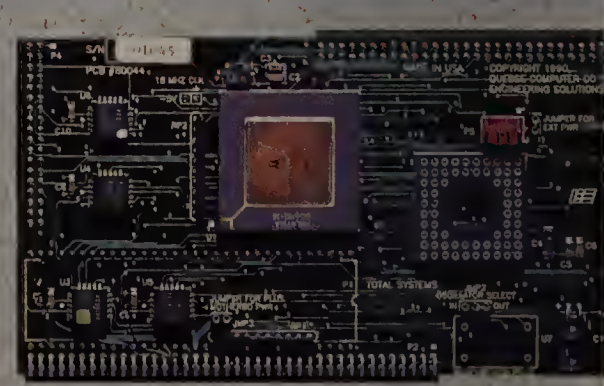
0292 Mac SE/30	$1995
0291 Mac IIsi	$1995

Gemini II

0045 030 33 mhz w/o FPU	$1195
3635 030 33 mhz w/Fpu	$1575
0047 030 40 mhz w/o FPU	$1325
3752 030 40 mhz w/FPU	$1850
3638 030 50 mhz w/FPU	$2175
2899 Gem Kit	$ 125

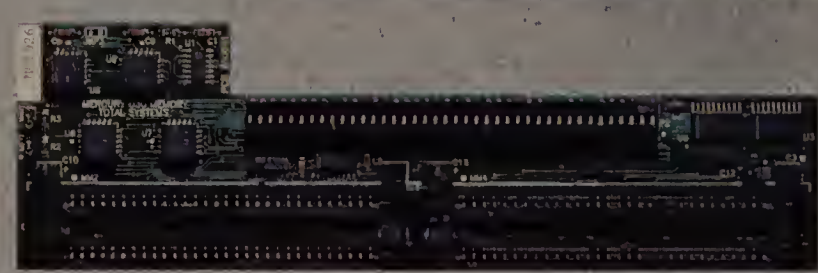
Mercury

0036 030 16mhz (Plus)	$518
0034 030 16 mhz w/FPU	$675
0043 030 16 mhz SE	$388
0041 030 16 mhzw/FPU SE	$550
0048 32-bit SCSI Mod. (Plus)	$188
0049 RAM Module	$245
0050 Mercury Kit (Plus)	$95



Mercury 030

Mercury 030 revitalizes your Mac 128, 512, Plus or SE, in easy stages. Double your speed with the 68030 CPU; later add the 32-bit memory unit for even more speed. Optional SCSI module for Plus and earlier for more efficient hard disk operation. If you work with large files, desktop publishing,or math intensive applications, add a 68882 chip any time. Installs easily, with a wide range of large screen display options. Virtual™ included free!



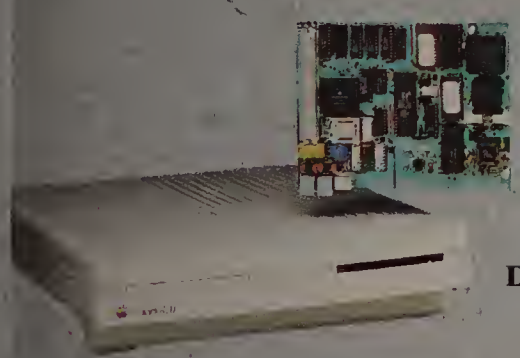
MODEMS

1•800•248•0800

The Mac Zone
Established 1986

DataLink LC

Maximize your LC with this multi-function internal card. More than 2400/9600 data/fax modem, the card gives the LC a math co-processor socket and even an extra serial port (system 7.0 compatible)! The V.42bis option offers 9600 bps error-free data transmission. Send-Fax is standard with Receive-Fax available in the near future. The package has everything you need to get on-line fast including communications software, more than $200 dollars of network memberships and on-line time included free, and a five year warranty.

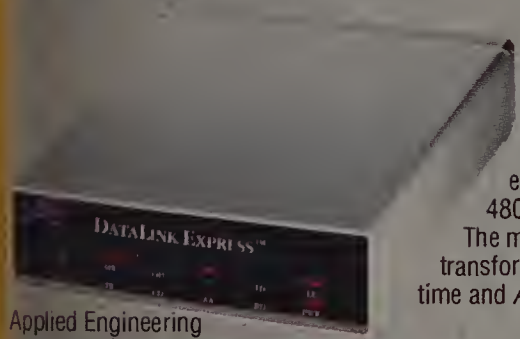


Applied Engineering List: $349

#3980 DataLink LC $245

DataLink Express

AE's DataLink Express offers what you need in an external modem. Its twelve indicator lights keep you fully informed of the modem's activities. The exclusive line-engaged indicator lets you know if a shared line is free or in use. The die-cast aluminum case is perfectly matched to the Mac's "platinum" color. On the modem's back panel you'll find both Apple's Mini-8 DIN connector and a DB-25 connector as well as a line jack and phone jack. Send faxes to any Group 3 fax machine with AE's Send Fax option and enjoy error-free data transmission at 4800 bps with optional MNP-5. The modem comes complete with transformer, software, free on-line time and *AE*'s 5-year warranty.



Applied Engineering List: $350

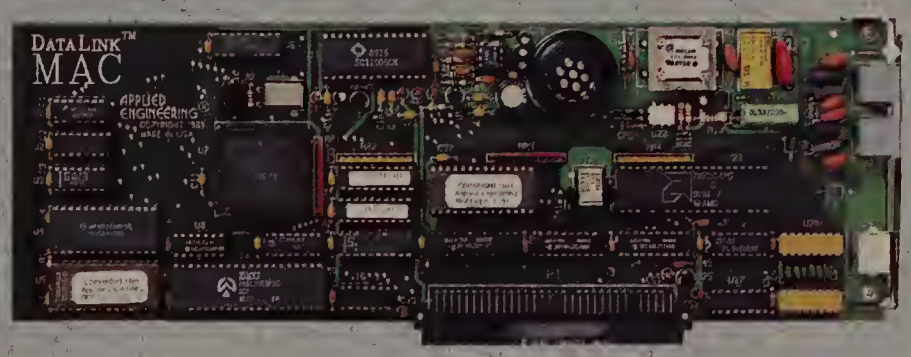
#3667 DataLink Express $235

DataLink/Mac

This full-featured internal data/fax modem for the Macintosh II family includes an extra serial port with driver software (System 7.0 compatible), communications software, free on-line time and network memberships (worth $200), optional send-fax and MNP-5 for error-free data transmission at 4899bps. Includes manufacturer's five-year warranty.

Applied Engineering List: $349

#3668 DataLink/Mac $235



DataLink/Mac Portable

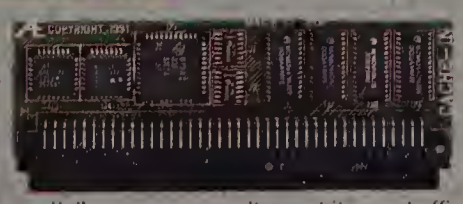
Keep your Mac Portable with this internal data/fax modem. It comes complete with easy to use yet powerful Send-Fax software allowing you to send text and graphics directly from your screen to any Group 3 fax machine. MNP-5 automatically corrects errors and doubles the transmission speed (when transmitting to an MNP-5 modem). The modem also includes communications software, free on-line time and network memberships (worth more than $200) and AE's five-year warranty.

Applied Engineering List: $299

#3670 DataLink/Mac Portable $205

ACCELERATORS

1•800•248•0800



FastCache IIci

DayStar's 64k FastCache IIcl for the budget-minded is the leader in standard cache cards. The powerful FastCache IIci completes the Mac IIci design by allowing it to operate at maximum speed. The Mac IIci's processor can't run at its most efficient level without a cache card. The FastCache IIci plugs directly into the IIci's Cache Connector and boosts processing speed from 30% to 70%! Installation is as easy as plugging in a NuBus card and can be done in minutes at home or the office. Proven reliability and performance for over a year.

DayStar Digital List: 379$

#2877 FastCache IIci $278

)range Micro 386

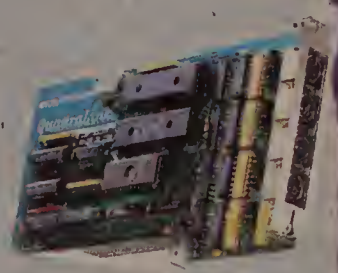
e 386 is truly a second computer functioning independently inside your acintosh. The dedicated 16 Mhz tel 80386sx processor d 1 Mb of on-board RAM xpandable to 16Mb) sures that your 1 Mb ograms execute with aximum compatibility. e Orange 386 is loaded ith innovative features, cluding two PC/AT bus ots which allow you to dd IBM PC cards inside our Macintosh. This capability pens the broad range of PC cards r the Mac.

range Micro

3562 Organge Micro $1,695

QuadraLink

QuadraLink is Applied Engineering's answer to clogged serial ports. With the proliferation of popular serial devices, printers, scanners, digitizers, plotters, modems, graphics tablets and the like, comes the need to control several serial ports simultaneously. QuadraLink is fully compatible with the Mac's Communication Toolbox and System 7.0 (when released). For software, the QuadraLink package includes software to create a "Shadow Driver" so its serial ports will be recognized by the software. Like the Mac II's existing serial ports, QuadraLink's four serial ports are standard Mini-8 DIN connectors. QuadraLink carries a full five-year warranty.



Applied Engineering

#3673 Quadralink $208

Microphone II

Microphone II has earned praise for its ease of use. Its scripting language makes using electronic mail services an automatic operation. Other types of file transfers are equally effortless. Microphone II now supports the hot new ZMODEM transfer protocol (in addition to XMODEM, YMODEM, KERMIT, and MacTerminal 1.1) and can operate modems at any speed from 50 to 57,600 baud. Microphone II sports improvements in the script language and offers more ways to execute scripts. For work with systems in foreign countries, Microphone II supports character substitution in seven languages under ISO-7 standards, plus user-defined character sets. It also supports large screen monitors and color, including color icons and offers VT102 and BT52 emulation.

Publisher Software Ventures — List: $295

#1902 Microphone II — $214

DoveFax Plus

DoveFax Plus offers the most sought-after fax software features such as: full background operation when sending or receiving a fax (with or without MultiFinder); automatic answer, which allows you to receive a fax without interruption; redialing, which guarantees fast delivery; pre-scheduled transmissions, that allows you to send multiple faxes after hours when rates are lower; customized cover sheets and more! With the DoveFax Plus, your Mac turns into a personal voice messaging system, as well as a full-featured fax machine. The DoveFax Desktop can be upgraded to the DoveFax Plus with the simple addition of a microphone and software.

Dove

#3514 DoveFax Plus $395
#3318 DoveFax 24/96 .....$294

ProModem 9600+

The most feature-filled fax modem available. Offered with MaxFax fax software, this 2400 bps data modem/9600 bps send and receive fax provides advanced functions like grey scale capability, customizable cover pages and the ability to import/export phone book data. Other features include a complete phone book, background operation, scheduled transmissions, distributions lists, and excellent status reporting. Packaged with Macknowledge communications software and cable.

Prometheus — List: $995

#3608 Pro Modem $698

FreeSoft Co. White Knight

White Knight is a powerful general-purpose telecomunications program that packs in almost every imaginable featuure. It combined technical sophistication, flexibiliyt, userfreindliness. White Knight takes strong advantage of the capabilities of 128K ROM's, which means that it will run on a Mac Plus, SE, II or later machine.

FreeSoft Co. — List: $139

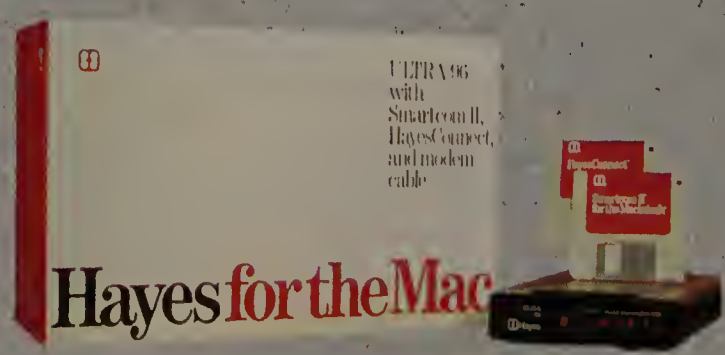
#2881 White Knight $84

Personal Modem 2400plus

Specially designed to simplify communications for the first-time home or business user, Personal Modem Plus products offer a complete PC or Macinto communications solution since they are bundled with Smartcom communications software and come with permanently attached computer and telephone cables.

Hayes — List: $199

#0451 Personal Modem ..$149



Ultra 96

It's all here in one product family for your Mac. Need 9600 bps V.32 capability? Need compatibility with 2400bps, or 300bps modem? Data compression? Error-Control? The Hayes for the Mac family of modems has them all! V.42 error control and V.42bis data compression provide error-free throughput to 38.4 kbps over dial-up phone lines. It even includes support for MNP 2-4 5 for backward compatibility with your old modems. If you're a Packet Switched Network fan, you'll love the V-series PAD for dial-up access X.25 networks.

Hayes

#0452 Ultra 96 Package .$925

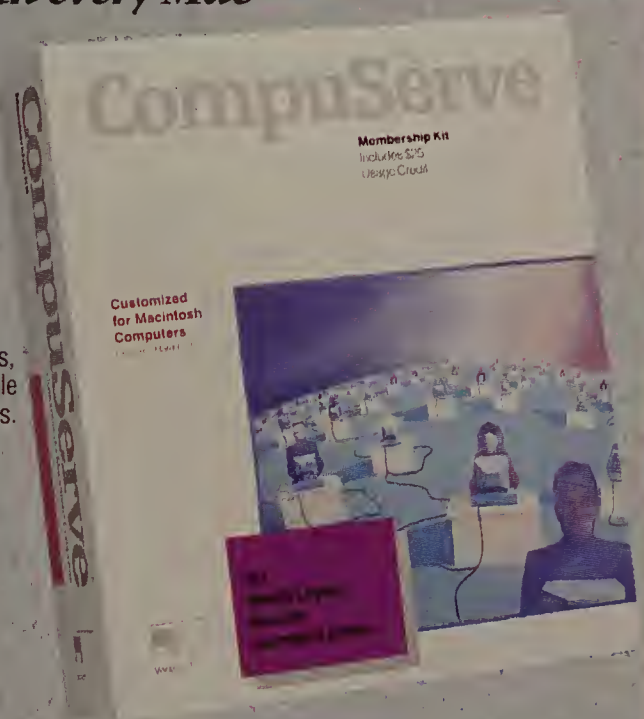
The Mac Zone
Established 1986

Free Compuserve Almanac with every Mac Membership Kit. Order now, limited time offer.

TelePort

TelePort plugs into your ADB connector (like your mouse and keyboard), eliminating a power adaptor, freeing your serial ports, and enhancing portability. TelePort, 2400 baud Hayes compatible modem, incorporates MNP5 data compression/error corrections.
Global Village List: $225

#3883 TelePort $128
#0395 TelePort 24/96 .....$184



Macintosh Membership Kit

The largest on-line data service, with over 750,000 users. Services include electronic mail, bulletin boards, special interest groups (Forums), and a discount department store. You can read the complete text from major newspapers and encyclopedias, plus stock data, weather forecasts and book and movie reviews. Mac users have three special interest Forums and bulletin boards . The Membership Kit contains everything you need to get started, including credit against your first two hours on-line.
CompuServe List: $40

#0213 Mac Membership Kit $22

TEFAX

Now you can send or receive faxes directly from your Macintosh and get a 16 level half-tone scanner and a 200 dpi printer all in one very convenient and portable package. Relisys introduces the NEW TEFAX System RA2125 - a complete fax system that gives you the advantages of both a dedicated fax machine with the convenient software package, AutoFAX. NEW AutoFAX software includes powerful graphics editing capabilities for scanned or faxed documents.
Relisys Systems List: $1,575

#0256 TEFAX $869

FAXGATE Plus

Imagine sending documents to any fax machine in the world from any computer on your network. If you have Microsoft Mail or QuickMail, all you need is FAXGATE and a FlexFAX, OrchidFax, or AppleFax modem. FAXGATE is an economical alternative to overnight dlivery and MailMaker, bundled with FAXGATE, insures that everything looks great when it gets there.
Solutions, Inc. List: $395

#3621 FAXGATE Plus $238

2400 Turbo Lexus Modem

Intelligent, compact 2400 baud modem. Fully compatible with Hayes AT command set. Easy to install and ready-to-use, all cables included. All the features you need in a modem, including auto answer, auto Dial and Advanced Diagnostics for error checking. Eight front panel LED lights let you know what the modem is doing. Compatible with all major communications software. Comes complete with everything you need to get started, including, MacKnowledge 1.02 MZ communications software, special introductory membership to CompuServe and Genie.
Lexus Turbo

#0028 2400 Turbo Lexus Modem $95

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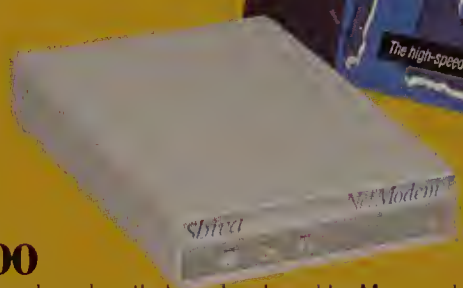
30-60 day Money Back Guarantees on most products

NetModem V.32

The NetModem V.32 is a 9600 bps modem that is designed to be shared over AppleTalk. The NetModem also includes Dial-In Network access software which allows a remote Mac or PC to dial into the network and use electronic mail, printers and other network resources.

Shiva Corp. List: $1,699

#3251 NetModem V.32 ..$1,165

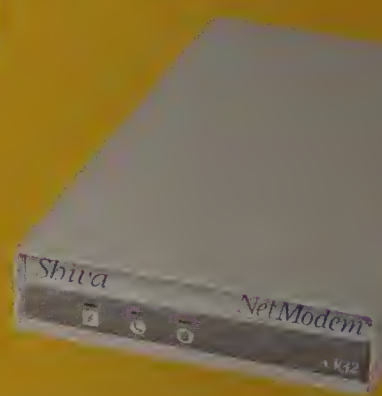


NetModem V2400

The NetModem V2400 is a 2400-baud modem that can be shared by Macs and PCs on the Apple Talk network. It plugs in anywhere along the network, needing just a single phone line. The NetModem V2400 also has Dial-in support so you can use the AppleTalk network from a remote location.

Shiva Corp.

#1615 NetModem V2400 .....$338



FastPath IV

Shiva FastPath 4 gateway allows Macintoshes on a LocalTalk network to access Ethernet network systems and services. It also allows Ethernet-based machines to access AppleTalk on a Local Talk network. Everyone has company-wide access to printing, electronic mail and file serveres, wherever they're located.

Shiva Corp. List: $2,795

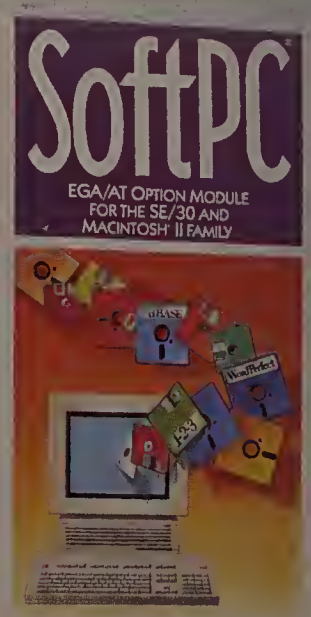
#2685 FastPath IV $1,885

NuvoLink SC

Plug the NuvoLink SC into the SCSI port of your Mac, and you can connect to an Ethernet LAN. The package includes AppleLAP manager, an Ethernet compatible drive, installation software along with statistical and diagnostic software to help manage NuvoLink SC effectively. Front panel indicators show Power On, configurations, diagnostics and network activity.

Nuvotech List: $495

#3115 NuvoLink SC.....$369



AT/EGA Module: Soft PC

The Soft AT/EGA Module is a powerful add on that enhances SoftPC's inherent XT compatibility and performance by adding AT capabilities with vibrant EGA color, LIM expanded memory support, and the ability to run programs that use a math co-processor.

Insignia Solutions List: $395 List: $199

#2506 Soft PC 1.3 ...$241

#3282 AT/EGA Module: Soft PC $124

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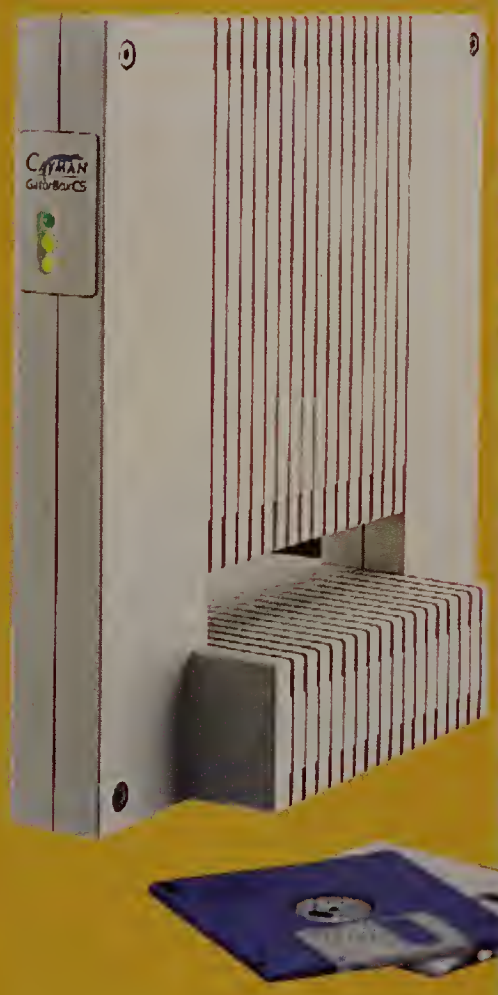
GatorBox CS

Cayman Systems' AppleTalk-Ethernet gateway, the GatorBox CS, connects an entire Macintosh network on LocalTalk to high speed Ethernet. With it, Macintosh users on LocalTalk can communicate with most minicomputer, workstation and PC users on Ethernet. The GatorBox CS fully supports AppleTalk Phase I and II and the TCP/IP protocol set. The GatorBox CS features two megabytes of RAM (including flash EPROM, for storing the operating software), hardware and software diagnostic capabilities and a universal power supply. Downloading of software or battery back-up is not required after unexpected power loss.

Cayman Systems — List: $2,795

#0181 GatorBox CS $1,955



TOPS 3.0 Network Bundle For Mac

TOPS 3.0 provides a complete network/E-Mail solution for any combination of Macs, IBM PCs, and Sun Workstations. With TOPS every computer is a server and each user decides which files are public or private. TOPS follows AppleTalk File Protocol so AFP-compatible multi-user applications will run properly. Includes TOPS Spool for background printing on the network, and a 20-user package of InBox 3.0.

TOPS — List: $299

#3167 TOPS 3.0 .....$186

Asante Ethernet Family

Asante Technologies' family of Ethernet solutions gives your Macintosh all the right connections. The MacCon+ network interface cards plug into your Mac to deliver high performance connectivity that's reliable and cost effective.

Asante Technology

Thick/Thin Products:

- # 3641 MacCon+ II E $269
- # 0221 MacCon+ II E64 .$304
- # 0020 MacCon+ 30iE ...$269
- # 2647 MacCon+ 30iE64 $304
- # 3648 MacCon+ SEE $269
- # 0327 Asante EN/SC $359

10 Base T Products:

- # 3885 10T HUB $989
- # 3945 10T MAU $99
- # 3643 MacCon+ II ET $269
- # 3642 MacCon+ II ET64 ..$304
- # 3646 MacCon+ 30iET $269
- # 3649 MacCon+ SEET $269

Mac to Mac 5-Pk.

Mac to Mac offers direct file transfers over any AppleTalk network, across zones, without a server. Increases work group productivity by allowing Macs on a network to quickly and simply send or retrieve files smoothly in the background, all without leaving your desk. No work disruptions, no waiting. Excellent disk and folder level security options. Complete fileshare transaction log. User list automatically maintained. Includes two-way text conferencing and messaging capabilities.

Caravelle Networks

#3886 Mac to Mac 5-Pk $164
#3887 Mac to Mac 10-Pk $218
#3888 Mac to Mac 50-Pk $949

DayStar LT200 PC & MC

The DayStar LT200 Boards allow an IBM PC, PS/2, or other compatible computer to connect to a LocalTalk Local Area Network. Once connected, the PC or PS/2 can share files and network devices (such as printers and file servers) with others on the network, including those using Macintosh computers.

DayStar

#2214 DayStar LT 200 PC $185
#2215 DayStar LT 200 MC $295
(microchannel)

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NETWORKING & CONNECTIVITY

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MacLink Plus/PC 5.0

MacLink Plus/PC 5.0 is a complete kit for transferring and translating documents between a Macintosh computer and an IBM PC. It comes with everything needed: an RS232 cable, software for both machines, the full library of translators, and DOS Mounter software. The library of over 350 conversion solutions translates file formats from word processors, spreadsheets, databases and graphics, while the included DOS Mounter software provides visibility to DOS disks inserted in the FDHD drive both on the Macintosh desktop and within all Mac applications.

Data Viz — List: $199

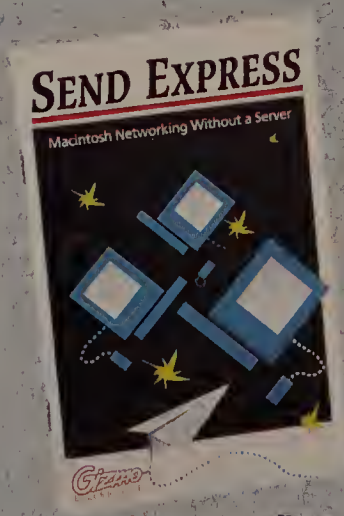
#0039 MacLink Plus.....$128

GraceLAN

GraceLAN lets you scan and profile every Macintosh, printer, PC, monitor, NuBus Card, network peripheral or SCSI device on any size network–without leaving your desk! Identify systems and memory configurations, software versions, desk accessories, INIT's, printer drivers and much more–all in real time. GraceLAN's powerful interface makes it easy to quickly obtain all kinds of detailed information. The Mac Details Window provides an extremely detailed report of each user's current hardware and software configurations in scrollable fields.

Technology Works, Inc. — List: $395

#0486 GraceLAN.....$217

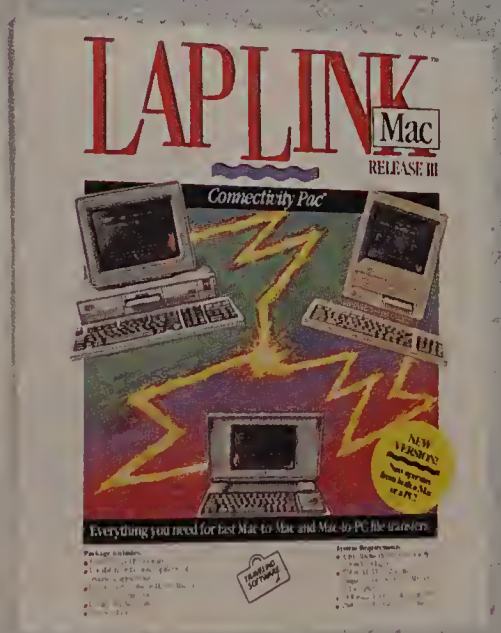


Send Express

Send Express is a Macintosh desk accessory that lets you transfer files, folders, personal notes, and Clipboard selections directly from your Macintosh to others in your AppleTalk network. Its approach is simpler than similar programs since it doesn't require a network server dedicated to file transfer processes. You can electronically send files and folders around your office. No more walking floppy disks from one Macintosh to another! The Note feature lets you communicate directly with your co-workers.

Gizmo Technology — List: $79

#0142 Send Express.....$56



LapLink Mac Release III

LapLink Mac Release III gives you everything you need for fast, simple Mac-to-Mac or Mac-to-PC file transfers including file translators. The LapLink Mac Connectivity Pac includes a cable and software for linking two Macs, or a PC and a Mac. Both versions include hard disk password security, modem connections and simple split screen design.

Traveling Software — List: 150

#3975 LapLink.....$92

Grappler LX

Open a world of printers for your Mac. The Grappler LX combines high speed performance with years of printer expertise to bring you the best Macintosh interface available. Software improvements make the Grappler more memory efficient and like other Grapplers, it's compatible with virtually every software package written for the Macintosh. Now you can print Mac documents on the HP Ink Jet Printer plus laser printers such as the LaserJet, Okidata, Kyocera and Blaser. Grappler cannot print Postscript files.

Orange Micro — List: $199

#3015 Grappler LX.....$133

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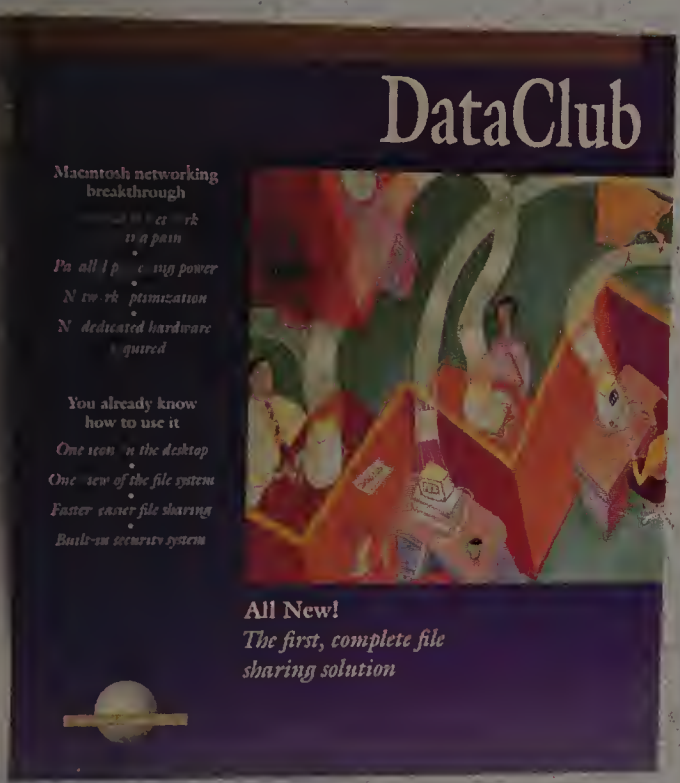
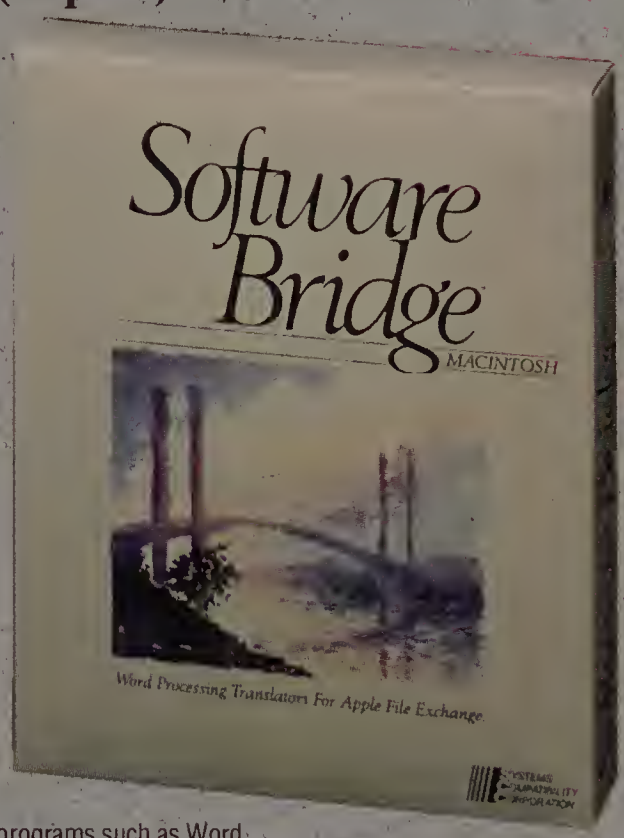


DataClub 1.1

DataClub is an amazing breakthrough in file server software offering real, tangible advantages over conventional file server systems. Instead of requiring dedicated hardware or multiple servers on the network, it's Virtual Server creates a single, shared disk which is centrally managed and maintained. By utilizing the combined resources of the network (available disk storage and server processing) DataClub provides centralized server access and unlimited expanability, yet requires no dedicated hardware.

International Business — List: $295

#3917 DataClub 1.1 (3-pack) $198
#3918 DataClub 1.1 (10-pack) ...$525



Software Bridge Macintosh

Software Bridge is a word processing file conversion program that operates under Apple File Exchange. It retains formatting as users convert (to and from) 24 popular word processing programs such as Word, MacWrite II, and WordPerfect.

Systems Compatiability — List: $129

#3894 Software Bridge $78

Clear Access

ClearAccess allows you to create SQL-type queries to most relational databases by just pointing and clicking on the data items you want. Queries can then be recorded as "scripts." Makes host-based data access a natural and transparent part of your experience, connecting you to a wide variety of corporate databases in a straightforward, uniform manner.

Fairfield Software — List: $460

#3992 Clear Access $350

EHelp

Give your Macintosh application the edge with context sensitive, structured hyper-text help with the EHelp help engine. EHelp supports PICTS, color, all Mac text fonts and styles, topics, hyper-text links, pop-up notes, modal and modeless help. Includes EHelp Compiler, EHelp Tester for compiling and testing help files, ANSI "C" interface, documentation and examples. Price includes perpetual license for single Mac application.

Endeavor Systems — List: $420

#0417 EHelp $210

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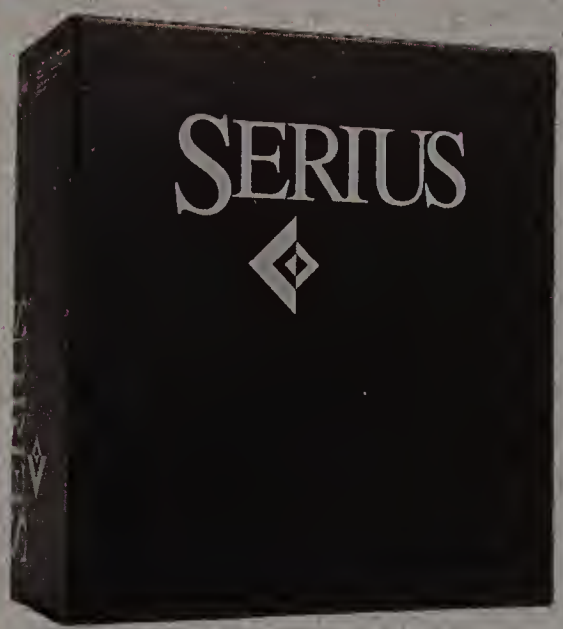
If you're not shopping at the Zone, you're paying too much!

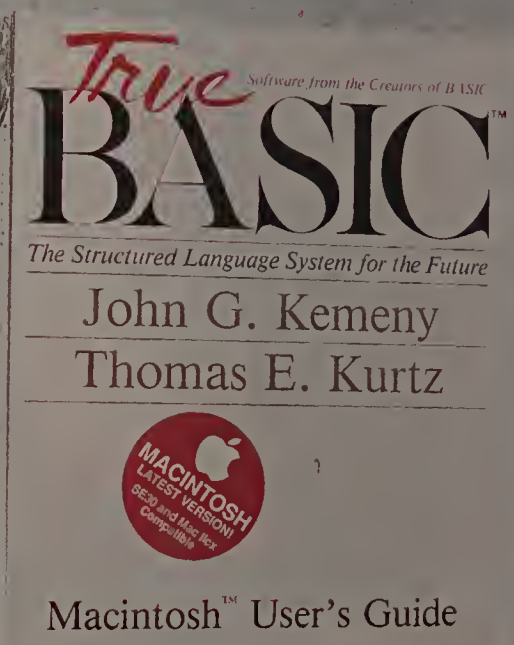


Serius Programmer

One picture is worth a thousand words. If you're a typical Macintosh user, you'd love to create your own custom software quickly and easily, but couldn't because you're not a programmer. Now you can! Built around Serius Programmer's revolutionary information control system, Object Interaction Protocol (OIP), Programmer's tools offer a variety of advantages over conventional development systems. Every custom application can use the full array of Macintosh graphic controls including windows, menus, buttons, lists and others. You'll have complete control over the look and feel of your new application. When you finish designing it on screen, Programmer will compile and save your work as a stand-alone application which can be used by anyone. You can even draw your own icon to display in the Macintosh Finder.

Serius — List: $295

#3409 Serius Programmer.....$210

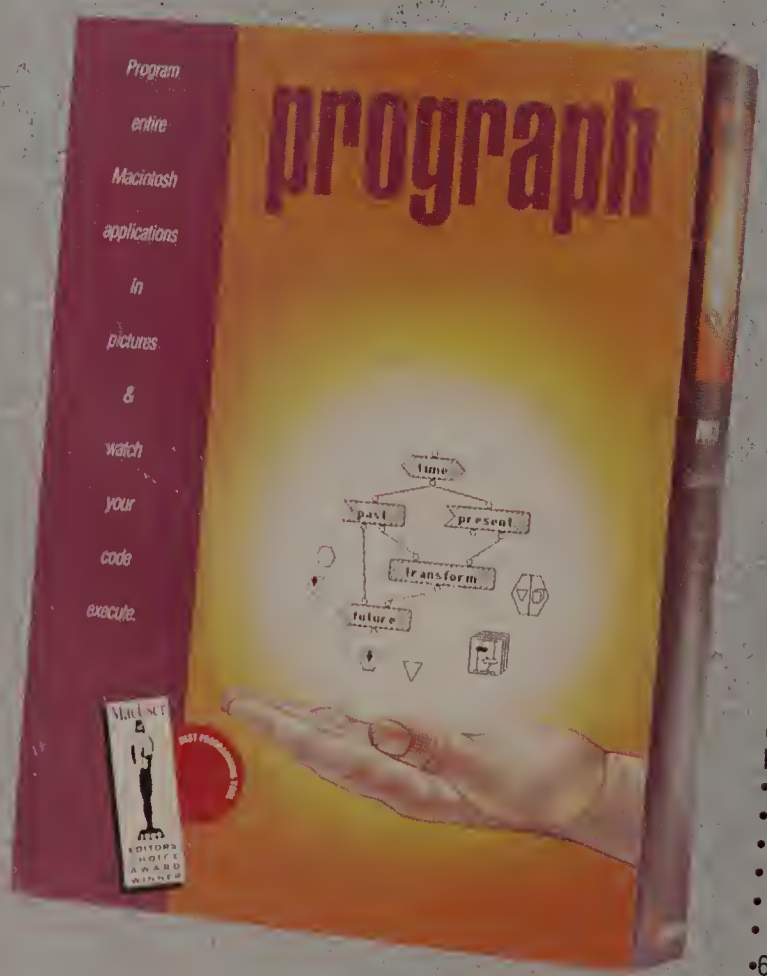


True BASIC 2.02

Use the BASIC that gets results—fast! It combines all the best features of modern structured programming in a BASIC that's fast, clean and yet still easy to use. It's fast because it combines a b-code compiler, linker and editor in quick fix or major software development. True BASIC is a solid, dependable solution.

True Basic, Inc. — List: $99

#1834 TrueBASIC.....$54



How to speed up program development and have fun doing it:

Prograph 2.0 with Compiler

1. Free programmers from the tedium of typing code so they can concentrate on the creative aspects of application development.
2. Get rid of the frustrating edit-compile-run-debug cycle by letting them design and edit programs while they're running—testing new ideas on the spot.
3. Liberate programmers from laboriously coding menus and windows by letting them click and draw their interface instead.
4. Eliminate the need for repetitious recoding by giving them object-oriented programming (OOP).
5. Turn abstract control structures into concrete diagrams so they can see where the data comes from and where it's going.

Put all these advantages into one single Visual Programming Environment and you get speedy application development and a bunch of creative programmers who are having a good time. What you get is Prograph!

"I can often get much further much faster with Prograph than with any of the other developer systems I've tried, including the Macintosh developers Holy Grail."—the Macintosh Programmers Workshop, Don Crabb, *MacWEEK*

"The Prograph environment is the single most enjoyable (yes, enjoyable!) development environment I have ever used. Period". Jeff Sullivan, *Computer Shopper*

Prograph 2.0 provides:

- Visual OOP language
- Visual editor/interpreter
- WYSIWYG interface builder
- 680x0 compiler
- Mac Toolbox support
- Importation of C code
- 60 day money back guarantee

TGS Systems — List: $395

#3431 Prograph 2.0.....$244

Save up to 60% off list prices everyday!

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Kurta 8.5 x 11 tablet with pen

The IS/ADB graphic tablet that allows you to draw, sketch and trace far more accurately than with a mouse. One of the biggest benefits is absolute positioning: every point on the tablet corresponds exactly to a point on the screen. The tablet includes a row of programmable functions keys, and "scale keys" to allow instant rescaling to match the computer screen so the tablet is a 1:1 source to output representation.

Kurta Corp. List: $395

#3009 8.5 X 11 Tablet with Pen $318
#3010 12X12 Tablet $384
#3011 12X17 Tablet $624

Personal Scan

The DEST Personal Scan is the first scanner to combine full-page, one pass, hand-held scanning with full page scanning in one desktop unit. Read almost any document into your computer: books, manuals, technical documents. Odd-shaped or oversized originals are no problem with the full-page, hand-held unit. Use the automatic document feeder and scan up to 10 pages at a time, fully unattended, for real productivity. Personal Scan comes bundled as a kit that includes everything you need to begin scanning today, such as: high quality 300 dpi scanning resolution, complete with cables and interface, one-year warranty. Comes in MAC and PC models.

DEST List: $995

#3929 Personal Scan with Recognize $685

DEST List: $695

#3930 Recognize OCR Software $515

The Complete Answer for Every Scanning Need
- **24 bit color**
- **256 shades of gray**
- **black and white**
- **includes Adobe Photoshop**

MICROTEK
Better Images Through Innovation.

ScanMaker 600ZS

Introducing the ScanMaker 600ZS, the newest addition to Microtek's award-winning series of color/grayscale scanners. Capable of scanning 24- bit color, 256 shades of gray and black and white, the ScanMaker 600ZS captures images with up to 600 dpi resolution. It boasts outstanding color image quality and features a new, compact flatbed design. A built-in SCSI interface makes installation a snap! More amazing is the price...hundreds less than you would expect to pay for a scanner with this many unbeatable features. Included with every ScanMaker 600ZS is a full version of Adobe Photoshop. Adobe Photoshop, winner of *MacUser's* 1990 Eddy Award for Software Product of the Year, is a sophisticated image editing and retouching program designed for artists and desktop publishers.

Microtek Labs, Inc.

#0369 ScanMaker 600ZS .....Call

ScanMaker 1850S

Microtek's ScanMaker 1850S is a revolutionary new 35mm slide scanner that's perfect for desktop publishing, presentation graphics and multi-media applications. You can scan 24- bit color and 256 shades of gray at up to 1850 dpi resolution. With a scanning area of 35mm x 35mm, ScanMaker 1850S is versatile enough to scan slides in portrait and landscape modes. Included is a full version of Adobe Photoshop (winner of *MacUser's* 1990 Eddy Award for Software Product of the Year), a sophisticated image-editing and retouching program designed for artists and desktop publishers.

Microtek Labs, Inc.

#0370 ScanMaker 1850S .....Call

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Call us for everyday low prices!

True-Color Hand Scanner

Animas is proud to present its True-Color Hand Scanner

- Definitive answer to your desktop publishing scanning problems
- ASC105 is invincible
- Fully equipped with Color Scan MacCheese™ software
- Flexibility and compatibility to paint, edit and save in the universal PICT format.

Animas — List: $799
#0149 Hand Scanner $575

Lightning Scan 400

Lightning Scan 400 provides the functionality of a flatbed scanner with the low cost and versatility of a hand-held scanner. In one quick pass any printed image becomes a high resolution Macintosh graphic. Lightning Scan 400 is the only hand-held scanner with a join feature for full page scanning. The exclusive snap-on guide ensures straight, even scanning. A RAM buffer makes it fast and selectable settings from 100 to 400 dpi provide sharp scans. Now includes ThunderWorks, new scanning and Image enhancing software and a DA for scanning anywhere. ThunderWorks converts images to 37 levels of gray and edits in 256 levels of gray on all Macs.

Thunderware — List: $549
#2212 Lightning Scan $384

MacTRAC ADB

MacTRAC ADB fits beside your keyboard. Since it's only four inches wide and stays put, it saves you desk space. It has three buttons that wrap around the ball so you can click with your fingertips or thumb and still keep your hand on the ball. The middle button serves as a drag lock to make graphics work easily. The ergonomically-designed unit has a sloped wrist rest to eliminate fatigue and is designed tofit the curve of your hand. Complete with a locking ring to keep the ball inside the unit.

MicroSpeed — List: $119
#3305 MacTRAC ADB $74
#3306 512/Plus $60

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Gravis MouseStick

For entertainment it's the high-scoring MouseStick. Its advanced optical technology and dedicated processing unit are ideal for flight simulators or mouse-intensive entertainment software. Includes pre-installed settings for popular games—or you can create your own.

Gravis — List: $130

#2740 MouseStick $64
#2741 MouseStick ADB $78

Gravis SuperMouse

For productivity and performance, the three-button high resolution Gravis SuperMouse is more than JUST a mouse. It requires minimal desktop space. Its buttons access menu commands, tool palettes or macro programs (QuickKeys Lite included). Ideal for graphics, CAD, DTP and professional users. A/UX, Exodus and SoftPC compatible.

Gravis — List: $130

#0055 SuperMouse $89

The Complete Full Page Scanner

This scanner is a full-page scanner with advanced features usually found in products costing much more. You can scan images up to 14" long and save files in popular image formats like TIFF, PICT, MacPaint and PS/EPSF. The powerful SmartScan software (included) now handles up to 256 shades of gray so you can easily edit and manipulate continuous-tone images for your documents.

The Complete PC — List: $1,199

#3232 The Complete Full Page Scanner $755

Half Page Scanner/400

The half-page scanner is an easy to operate hand-held scanner which also handles up t 256 shades of gray. It delivers precise tracing control, scans at up to 400 dpi and sells a a price that just begs you to buy it. It's no wonder *Macworld* called it "the hands down favorite." It comes with special-effects filters that let you sharpen, smooth and detect edges as well as lighten and darken images.

The Complete PC — List: $399

#3231 The Complete Half Page $294

New

- **Scan color and B&W**
- **Full version of Adobe PhotoShop included**

Abaton 300/Color and GrayScale Scanner

The new affordable 300/Color Scanner is designed to handle all of your scanning needs. Provides 24 bit color and 256 grayscale, halftone, line drawings and text. Almost 28% faster than Microteck 300zs and 300% faster than the Epson ES-300C. The Scan 300/Color is covered by a one year parts and labor warranty. Bundled with Eddy award winning full version Adobe Photoshop.

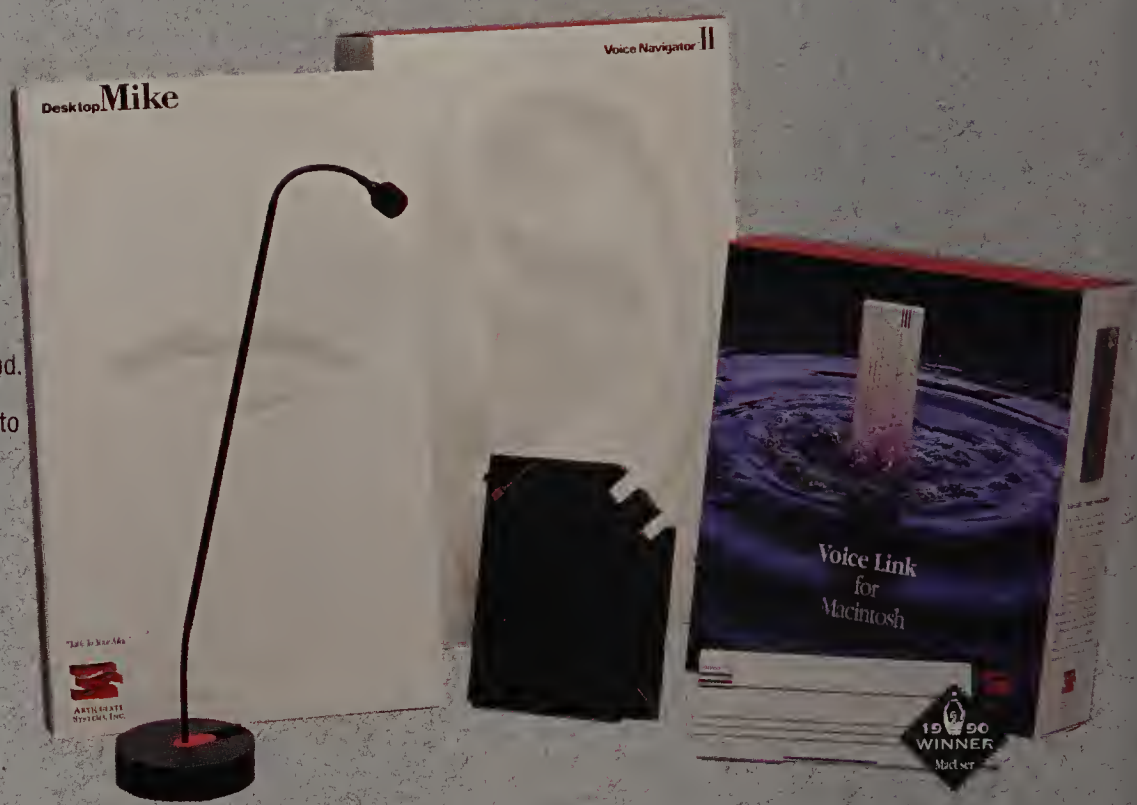
Abatron — List: $2,890

#0216 Abaton Color Scan 300 .....$1,795
#2916 Abaton Scanner 8 Bit GS $1,495

The Mac Zone
Established 1986

INPUT/OUTPUT

1•800•248•0800



Voice Link

Voice Link sound system includes everything you need to integrate voice and sound with your Macintosh applications. You'll find the Voice Link digitizer, sound editing software, voice messaging software and other tools that make it easy for you to integrate sound. Advanced audio technology dramatically increases the quality of sound input on the Macintosh. Delivers unsurpassed audio quality to Voice Annotation, Voice Messaging, Narration and Sound Effects. Voice Link is interrupt-driven with a RAM buffer.

Articulate Systems, Inc. List: $269

#3933 Voice Link $199

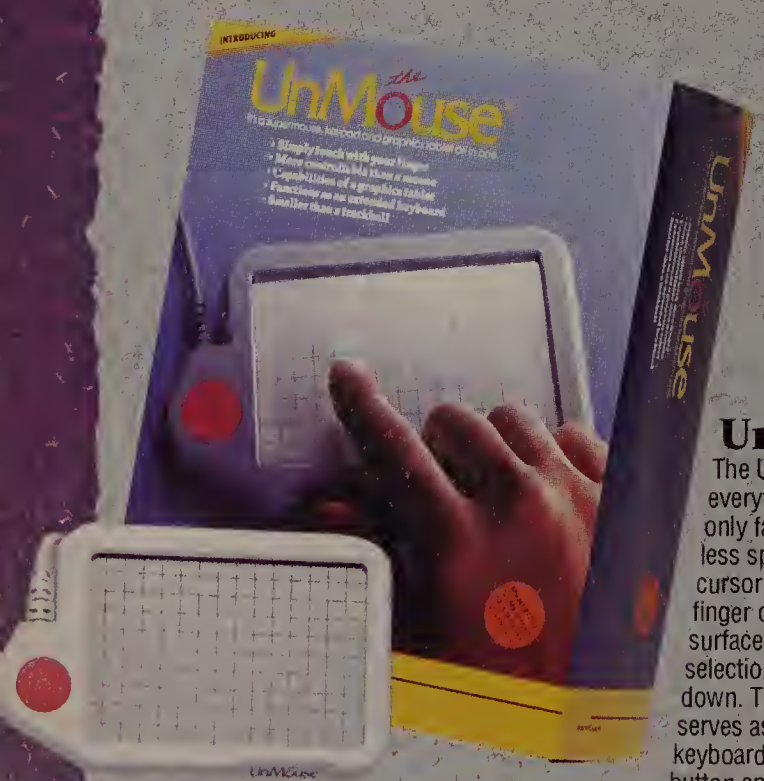
Voice Navigator II

Just speak to your computer and it will do what you say! Voice Navigator II allows you to control your Mac by speaking to it. It is compatible with all Mac software and can run on any Mac. Using state-of-the-art technology, you can use any language, accent or voice to drive your Macintosh faster than you ever thought possible. It also provides the highest quality sound digitizing available for recording voice and music. It's the ultimate productivity tool.

Articulate Systems, Inc. List: $795

#3932 Voice Navigator II $570

Order by Fax (206) 881•3421 any time 24 hours a day!



UnMouse

The UnMouse does everything a mouse can, only faster, easier and in less space. To move the cursor simply slide your finger over the glass surface. To make a selection, merely press down. The UnMouse also serves as an extended keyboard. Tap the large red button and you instantly have a Power Keypad with 16 keys available to execute macros (60 in advanced mode). With its one million touch points the UnMouse also performs admirably as a graphics tablet.

Microtouch Systems List: $235

#3412 UnMouse $180

ScanMan Gray Scale Scanner

Add photos, drawings, text, etc., into any application with Logitech's ScanMan Model 32 hand held scanner and enhanced version 2.1 software. Easily merge two or more scans into one full-page image. 32 gray scales offer superior image quality and easy editing capability. Save images in MacPaint, TIFF and PICT formats. Advanced half-toning capability provides optimum image output on your monitor or non-postscript printers.

Logitech, Inc. List: $549

#2561 ScanMan Model 32 ..... $298

The Mac Zone
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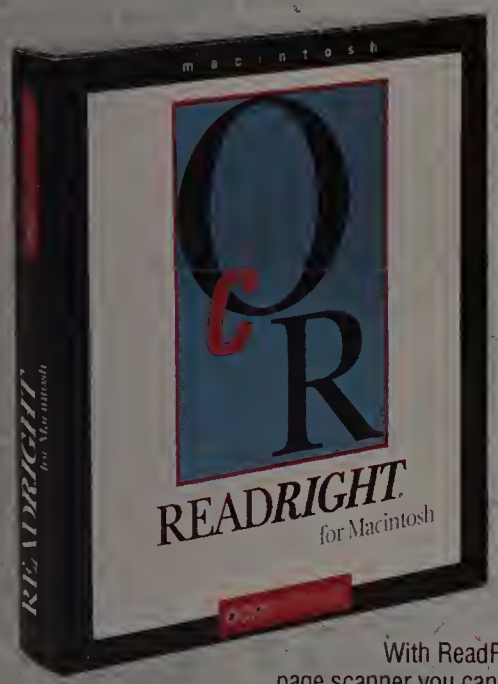
Your One Stop Source for all your Mac Needs



ReadRight

With ReadRight for Macintosh and a full-page scanner you can easily and efficiently convert paper documents into editable computer text files. Recognizing with an accuracy of 99.9%, ReadRight automatically separates text from graphics and outputs text directly into your word processor, spreadsheet or database. Advanced features include a built-in dictionary, error checker and deferred processing.

OCR Systems — List: $499

#0461 ReadRight $329

DataDesk SwitchBoard

New SwitchBoard is the first user-configurable keyboard. Its unique modular design allows you to arrange the Alpha, Cursor and Numeric keypads into many different positions to best suit your computing needs and comfort. Additional input devices such as TrackBall, vertical function keys, digitizer tablet and programmable macro keys can either replace existing keypads or be added to the keyboard. This allows SwitchBoard to evolve with your needs and preserves desktop space since all modules can be integrated into a single unit. Switchboard is the first keyboard engineered to work on both IBM and Apple computers.

DataDesk International — List: $240

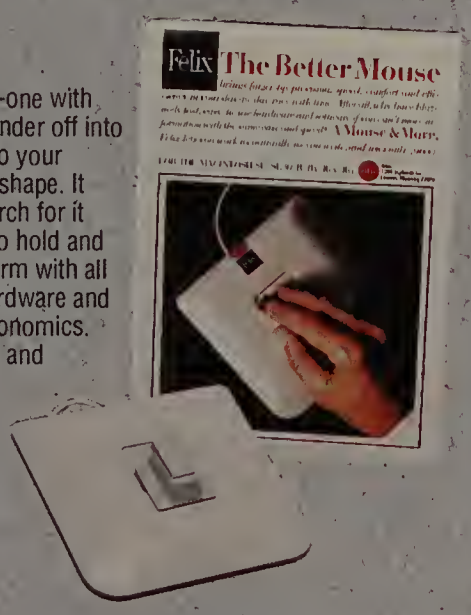
#3326 DataDesk $158

Felix

Unlike a mouse, Felix maps one-to-one with your screen. The arrow doesn't wander off into limbo. Felix automatically adjusts to your screen, no matter what the size or shape. It stays put so you won't have to search for it under papers. It's as comfortable to hold and use as a pencil. Felix lets you perform with all the speed of your sophisticated hardware and software because of its unique ergonomics. Since Felix uses optical technology and is self contained, it never needs routine maintenance.

Altra — List: $170

#2935 Felix...$116



Sony Tapes & Disks

Sony data cartridges and disks offer a simple to use, more efficient means of data storage. Designed and constructed to provide durable, accurate data storage and retrieval. Tested to ensure reliability.

Sony

#0932 QD 2040 40 Mb tape $19
#0938 50 Pk DS/DD 800K Disks $39
#1158 10 Pk DS/DD 800K Disks $12
#2192 10 Pk DS/HD 1.44 Mb Disks .. $19
#2193 50 Pk DS/HD 1.44 Mb Disks .. $75
#3109 QD600A 60 Mb Tape $21
#8566 360K 5.25" Disks, 10 Pk $9
#8567 1.2M 5.25" Disks, 10 Pk .. $18

Enhanced Keyboard

This extended keyboard utilizes the technology every serious Macintosh lover raves about. The smooth full-stroke, audible-click key action makes data input easier, and Cutting Edge's exacting quality control and testing makes it dependable. It has been widely accepted in business and professional settings, trusted because of Cutting Edge's commitment to customer service and satisfaction. When other keyboards break down, or when you're simply ready for the advantages of extended keyboarding, Cutting Edge is the one to choose. Apple Desktop Bus interface compatible.

Cutting Edge — List: $189

#0435 Enhanced Keyboard $129

The Mac Zone
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VIDEO MONITORS

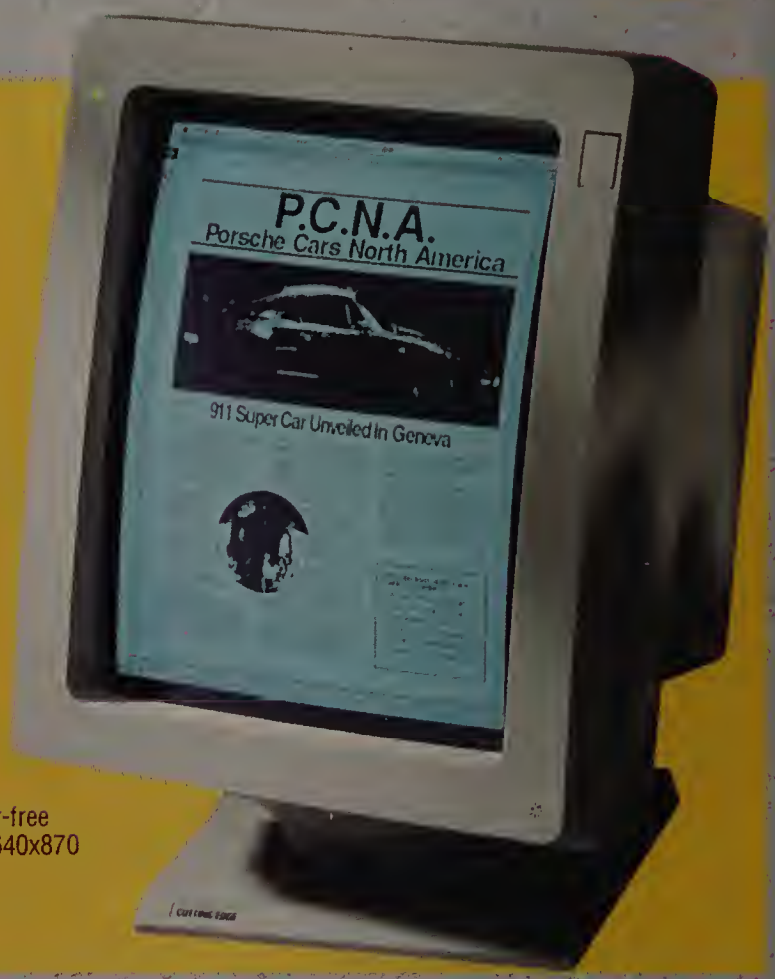
1•800•248•0800

RasterOps 24STV

New generation 24-bit True Color display board with real-time video in a window. The 24STV drives a 13" monitor in 1,2,4, 8, or 24-bit color modes at 640 X 480 resolution featuring a 2X and 4X Pan / Zoom and Extended Desktop. A 1-bit mask plane allows windows or buttons to overlay live video windows. MediaGrabber application program included to provide extensive control over the display and capture of a single video frame or a sequence of frames for use as an animation file.

RasterOps List: $1,795

#0005 24STV $1,299



Cutting Edge 15" Full Page Monitor

Eliminate all the scrolling, scrunching and squinting of a small screen. The monitor can display an entire 8-1/2"x11" on screen with flicker-free refresh rate of 75 Hertz and a high resolution of 640x870 pixels.

Cutting Edge List: $899

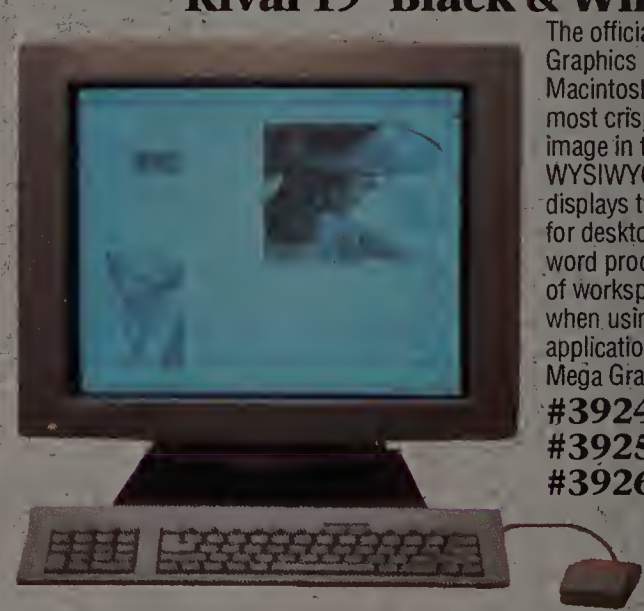
#3303 FPD SE/30 ....$579

Rival 19" Black & White Monitor

The officially acclaimed Mega Graphics Rival is now available for all Macintosh models. It givesyyou the most crisp, most clear and brightest image in the business, truly WYSIWYG. Because the 19" screen displays two facing pages, it is ideal for desktop publishing, layout and word processing. The wide expanse of workspace is an enormous benefit when using CAD and spreadsheet applications.

Mega Graphics List: $1,698

#3924 II $1,199
#3925 SE/30 ..$1,199
#3926 SE $1,199



T-16 Color Display

Spread out with almost twice the display area of the standard 13" color monitor. View your work exactly as it will be printed at actual size - 72 dpi. Save almost half the cost of a 19" color monitor. Get the sharpest, clearest color display at any price. The T-16 has excellent colors, linearity and sharpness, and it sells for a lot less than its larger cousins. The T-16 is an excellent choice for CAD/CAM or color graphics.

E-Machine List: $2,995

#3919 T-16 8-bit Color System $2,095

Sigma L-View Multi-Mode Monitor

An ergonomic monitor design offers user-oriented details like a tilt/swivel base and paper white phosphor. L-view's Low-Emission design meets guidelines for electromagnetic field emissions established by the Swedish National Board of Measurements and Testing. I-view includes video card, 19" monitor, control panel software and user's guide.

Sigma List: $1,999

#3854 Multi-Mode Monitor $1,475

The Mac Zone
Established 1986

The Real Font Menu

MenuFonts replaces all your Font menus with this custom Font menu. Now you can see the font before selecting it.

MenuFonts features ***KeyScroll***, with the menu down, type the first letter of a font's name-- the menu scrolls to select the font.

FREE INSIDE: Fastformatter

DUBL-CLICK

Menu Fonts 3.0

Displays each font name on your menu in its own typeface so you can see what your fonts look like. With the Key Scroll feature, type the first letter of the font name and the list scrolls to the right place. Specify point size and color (with color hardware) for menu display. Supports NFNT font numbering system and is MultiFinder compatible.

Dubl-Click Software List: $60

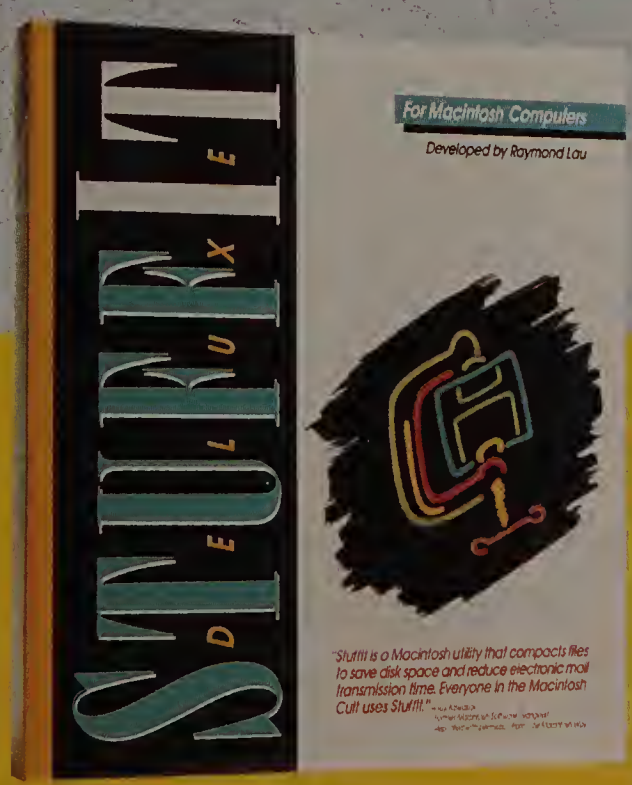
#3226 Menu Fonts $28

MacPrint

Print any Macintosh application on many different printers. MacPrint is a chooser-level program, completely transparent in operation. It displays all your printer's resident fonts on screen. If none is found, it creates a printable font based on Macintosh QuickDraw screen font, maintaining spacings, style, and word wrap. What you see on the screen is what prints. Supports all internal fonts and font cartridges for HP and HP compatible printers like Pacific Data Products, Everex, Anacom and Computer Peripherals.

Insight Development List: $149

#2423
MacPrint 1.2 ..$93



StuffIt Deluxe

StuffIt Deluxe makes file compression so simple even beginners can benefit immediately. This newest generation of the popular compression, encryption and archiving application offers 75 new features including many new compression techniques (such as file-specific optimizers) and new security methods. StuffIt Deluxe opens and manipulates multiple archives with a Finder-like interface.

Aladdin Systems List: $100

#3458 StuffIt Deluxe ..$61

Init Picker 2.0

INITPicker 2.0 helps you manage the tangled web of INITs that are supposed to make your system more productive but frequently only serve to screw things up.

List: $69

#2191 Init Picker 2.0 .....$35

My DiskLabeler III

myDiskLabeler III creates neat practical disk labels that list the contents of disks, or attractive custom labels. Print up to 100 filenames on a label. Complete directories for disks or hard drives can be sorted, displayed and printed on standard paper. Custom graphics and icons can be added to the label in a flash.

Williams and Macias List: $83

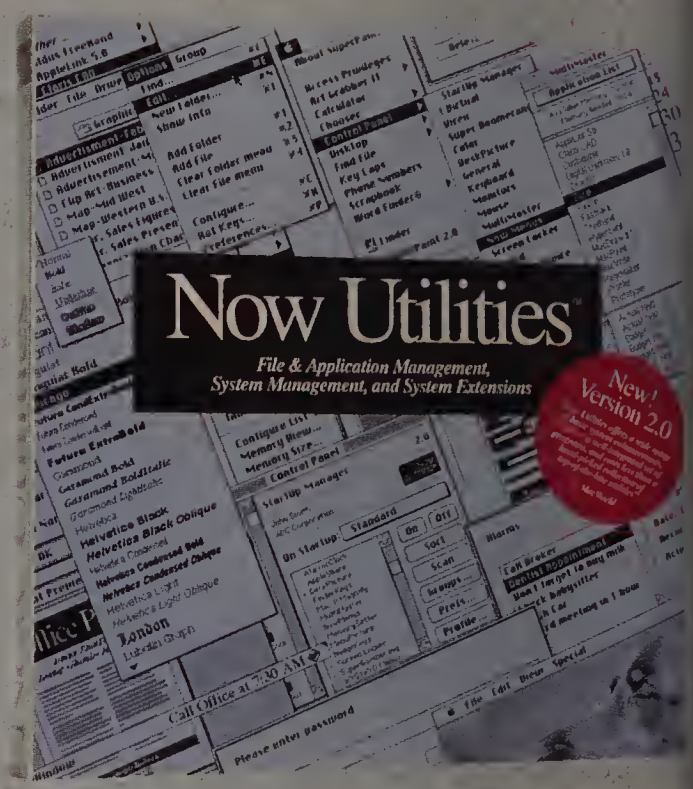
#3324
My DiskLabeler...$41

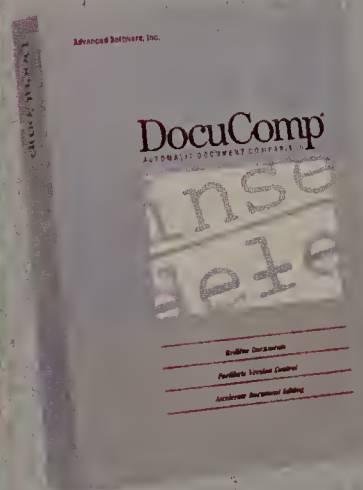
Intouch

Intouch is an easy-to-use Macintosh Desk Accessory that stores unlimited names, addresses, phone numbers and notes, prints envelopes and labels, and dials telephone numbers. Because *Intouch* is a DA, it provides you with instant access to your data.

Advanced Software List: $80

#0282 Intouch ...$40





DocuComp

DocuComp automatically generates marked-up documents in seconds! It can compare any two versions of a document and report changes as minor as an inserted comma and as major as a complete rearrangement of text.

Advanced Software List: $149

#2847 DocuComp $88

Now Utilities 2.0

According to *MacUser*, "Now Utilities 2.0 is a must-have for experienced users and novice users alike." Featured products include SuperBoomerang, which *MacWeek* rated as the best of the Open & Save dialog boxes enhancers; StartUp Manager, the most powerful INIT and cdev manager; WYSIWYG Menus, which displays font names in their own typeface; MultiMaster, the most versatile file and application launching utility; and Screen Locker, a beautifully streamlined executive password protection system.

Now Software List: $129

#3779 Now Utilities.....$74

Freedom of Press 3.0

With Freedom of Press a PostScript printer is not required to output PostScript files. You can now print them to non-PostScript devices like the Hewlett Packard LaserJet II, IIP and III, DeskWriter, PaintJet and Epson LQ Dot Matrix Printers. It comes with 35 scalable PostScript fonts and supports all additional fonts including Adobe Type I and new Microsoft True Type.

Custom Applications List: $495

#3209 Freedom of Press 3.0 .....$254
#3839 Freedom of Press Light $55

Retrospect 1.2

With Retrospect you can remove seldom-needed files to permanent storage and free space on your hard disk. It works with almost any media, from floppies to re-writable optical discs. Retrospect maintains a catalog on your hard disk so you always know where to look for archives or backup files.

Dantz Development List: $249

#2586 Retrospect 1.2 .....$146
#3805 Retrospect w/ Rem 10 pack $264
#3828 Remote 10 pack $146

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Virex

Virex® is a comprehensive solution to the threat of Macintosh computer viruses. It detects the presence of computer viruses and repairs files infected by all known Macintosh viruses. Once a system is disinfected the Virex INIT continuously monitors the computer so that virus infections are prevented.
Microcom List $100
#2077 Virex $56

Carbon Copy Mac

Carbon Copy Mac™ is a network and communications software that allows you to remotely operate another Macintosh, transfer files in the foreground or background or manage your AppleTalk network. With complete control of another Mac's software, peripherals, screen, keyboard and mouse, Carbon Copy Mac is ideal for training users, collaborating on projects and supporting and troubleshooting your AppleTalk network.
Microcom List: $199
#3285 Carbon Copy Mac .$116
#3477 Twin Pack $188

911 Utilities

Microcom 911 Utilities is a comprehensive problem recovery package for the Macintosh. 911 incorporates an extensive Troubleshooting Guide along with a collection of powerful utility programs that enable you to recover files thrown in the trash and recover files infected by known Mac viruses.
Microcom List $150
#3823 911.....$83

PYRO! 4.0

Images left on screen too long can burn a permanent image into the phosphors. Pyro! automatically substitutes a variety of user-selectable graphics routines designed to keep damage from happening. Touch any key or the mouse to bring back the original display.
Fifth Generation Systems List: $30
#2194 Pyro $24

SuperLaserSpool

Controls your printer in the background as you work in the foreground. Automatically processes your documents, sends them to the printer and even downloads fonts while you continue working. Gets your Mac back in seconds instead of minutes or hours!
Fifth Generation Systems List: $150
#1020 SuperLaser $92

Suitcase II

Suitcase II expands your font and desk accessory menus to as many as 255 items each. Lets you directly install and use any font, DA or KEY. Configure special Font/DA files for each application. Helps keep your system file to a manageable size.
Fifth Generation Systems List: $60
#2002 Suitcase $48

FastBack II

FastBack II is a high-speed backup utility that allows a user to back up a hard disk at more than 1 MB per minute while simultaneously formatting the backup disks. The program uses advanced error detection and correction so that data can be restored even if the backup disks are damaged in storage.
Fifth Generation System List: $189
#3826 FastBack II ..$117

PowerStation

Lets you organize work for quick and easy access to applications, documents and desk accessories. Move quickly between applications. Lets you arrange software tools on 16 "pages" to find hundreds of applications or documents without searching folders.
Fifth Generation System List $60
#2067 PowerStation.....$33

FLASH

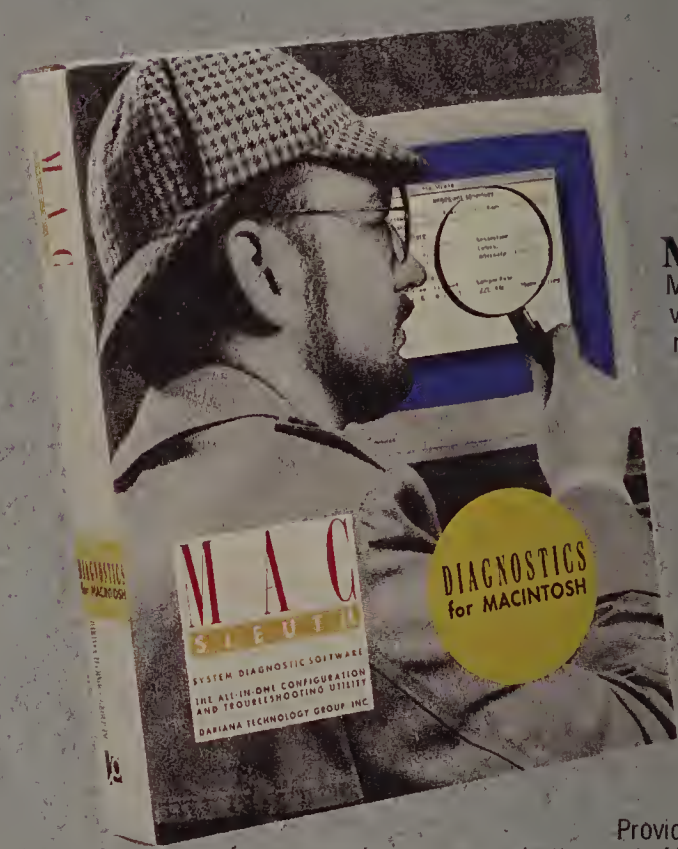
Fastest, friendliest way to transfer files over AppleTalk. Transfers are done the Mac way - with folders. To send files to Joe, simply drop them in a folder named "to Joe" and they'll be sent in the background while you work, even across network zones. One set will serve an unlimited number of users per zone.
Beagle Brothers List: $200
#3219 Flash $124

After Dark 2.0

After Dark 2.0 prevents screen burn-in and it does it with style! In fact, use any style you choose including fish, flying toasters, lightning bolts, meteors, abstract art, crawling worms, a jump to light speed, or a basic dimmer. Also features system IQ, password protection and sound!

Berkeley Systems — List $40

#2785 After Dark 2.0 ..... $22

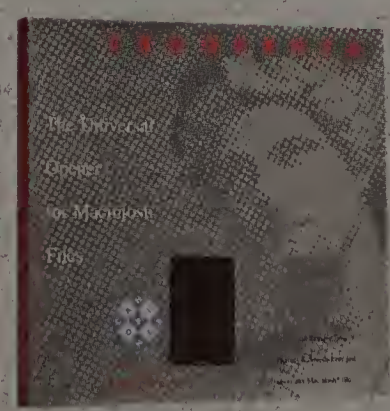


MacSleuth

MacSleuth is a valuable utility to help resolve hardware and software conflicts on your system. Features include: General System information, status of all installed device drivers, current settings of Permanent Parameter RAM and more. You can also view the contents of the clipboard and investigate memory usage. Provides on-line help to make the most of information provided.

Dairana Technology — List $149

#3799 MacSleuth $85



CanOpener 1.1

CanOpener lets you scan any disk or network volume, find files by content, then view the contents and copy anything you need. It can recognize text in ASCII format, pictures in MacPaint, MacDraw II, TIFF, PICT, PICT II, ICON and EPS formats as well as sounds in "snd" esource format. Since CanOpener overrides file formats, it can open documents or missing applications or even recover data from broken files.

Abbott Systems — List $125

#2895 CanOpener 1.1 ..... $62

PicturePress

PicturePress compresses and decompresses 24-bit color images 10 to 60 times, using the emerging Joint Photographic Experts Group international still image compression standard. PicturePress operates alone or can be accelerated 20 to 50 times by the PicturePress Accelerator Card, a Programmable 60 MIPS image processing NuBus Card.

Storm Technologies

#3993 Picture Press $120
#0179 Accelerator Card & Software $653

Cheshire 1.0

The fastest way to convert numbers into business charts right in PageMaker, Work, MacWrite II or MacDraw II documents–without switching to a separate program. Press one key, Cheshire offers bar, column, line or surface chart types. Pick a chart, Cheshire instantly plots your numbers and pastes the charts into your document. It can also plot what you type into its window. Includes 21 B&W chart types, or add more any time. *MacUser* 1990 Editor's Choice Award [illegible] Macintosh-Best Utility.

Abbott Systems — List $125

#3927 Cheshire 1.0 ..... $61

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PowerICONS

PowerICONS lets you create icons to launch an application or attach a document. It uses a copy of the application icon so you are working with a familiar image. Move launchable icons anywhere or have multiple icons for one application without adding confusion to the system. Unlike DAs and INITs, PowerICONS uses no system memory to operate!

Magic Software — List: $100

#3329 PowerICONS....$38

BackMatic

BackMatic automatically backs up your files each time you shut down your Mac. Install this handy INIT in your system folder and you'll never need to remember to make a backup again. Configure it to back up only files changed or all your most important files.

Magic Software — List: $100

#3328 BackMatic $49

AutoSave II

AutoSave II saves files automatically with the applications and time interval specified. *Macworld* (7/90) said, "It's so useful, it should have been built into the Macintosh system software."

Magic Software — List: $50

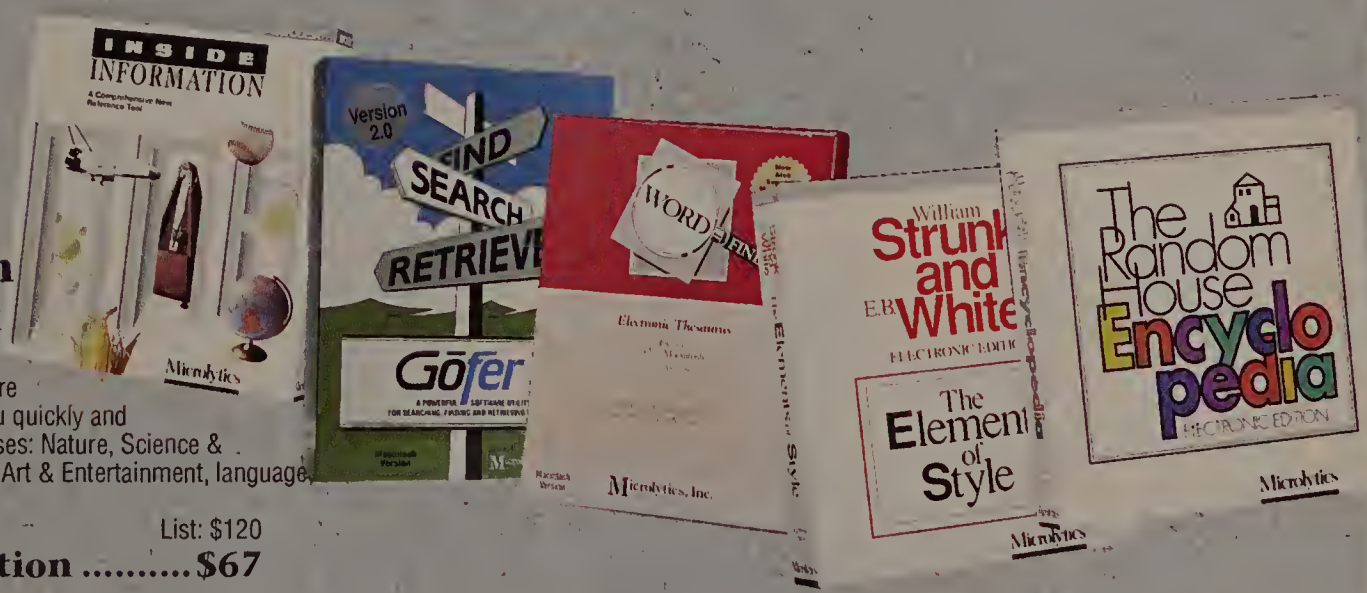
#1244 AutoSave II $26

DiskDoubler 3.0

DiskDoubler compresses your files whenever you save them and expands them whenever you open them. In effect, it doubles your hard disk (and floppy disk) storage capacity. It works transparently within any application and operates in the background under MultiFinder. Disk Doubler works with documents and applications, plus sound, graphics and scanner files.

Salient Software — List: $70

#3515 DiskDoubler $44



Inside Information

If it's out there, it's in here! This new DA is a comprehensive reference tool organizing the English language into logical categories of defined words. More than a dictionary or thesaurus, it lets you quickly and easily explore any of seven general Classes: Nature, Science & Technology, Domestic Life, Institutions, Art & Entertainment, language and The Human Condition.

Microlytics — List: $120

#0437 Inside Information $67

Gofer 2.0

Gofer 2.0 adds many useful new features to this popular file finding utility. It now works with Word 4.0, MacWrite II, FullWrite and MS Works. It has a Move to Desktop command, wild card search and the ability to save and retrieve such criteria in their own files. An enhance export feature lets you select a specified number of lines above and below the "hit line".

Microlytics — List: $60

#1940 Gofer $44

The Random House Encyclopedia

A new DA based on best seller Random House Encyclopedia. Quickly and easily access information by exploring general categories: Geography, History, Philosophy/Religion/Mythology, Social Science, the Arts, Science, Sport & Leisure, Law and Government. A unique resource for learning, a pleasure to use.

Microlytics — List: $120

#0438 Encyclopedia $67

Word Finder V2.0

Installed as a DA, Word Finder gives access to a 220,000-synonym thesaurus. Synonyms for a highlighted word are instantly displayed to be used. It also helps confirm both word meaning and spelling. A smaller database is provided for users with limited disk space.

Microlytics, Inc. — List: $60

#1501 Word Finder $33

The Elements of Style

Now The Elements of Style is available for your Macintosh: the ideal tool to make your writing crisp, succinct and powerfully effective. Seven rules of usage, eleven principles of composition, matters of form, a list of often misused words and a style guide will guide any user toward a writing style that, according to Strunk, "makes every word tell".

Microlytics — List: $60

#0416 Elements of Style $33

The Mac Zone
Established 1986

MasterFinder

MasterFinder is the complete disk management utility. MasterFinder allows for the complete control and manipulation of files and folders on any hard drive or floppy disk. It's a total replacement for the Mac Finder. Using a concept of window panes as its basic user interface, each pane displays file names from a directory of a mounted drive.
MasterFinder's start-up view, the Pane View, consists of four panes that can display information on all mounted drives.

Tactic Software — List $99

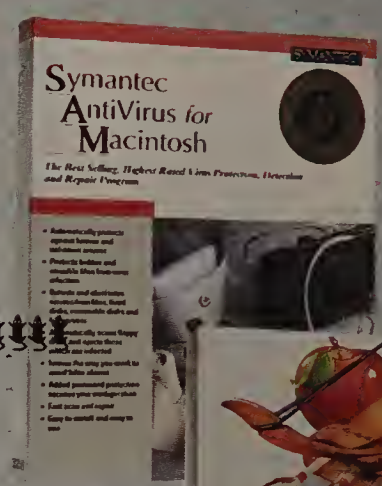
#0148 Master Finder $49

SAM 3.0

The Symantec Anti-Virus for Macintosh detects viruses by monitoring the suspicious activities that characterize them. The INIT portion acts like a watchdog during startup to detect viral activity. The CDEV portion operates during normal Mac usage and offers a number of options for checking disks and folders as you work. SAM has an Audit Trail to keep track of its activity and your responses.

Symantec — List $100

#0116 SAM 3.0 .....$66

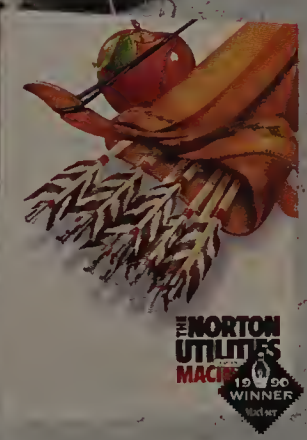


Norton Utilities

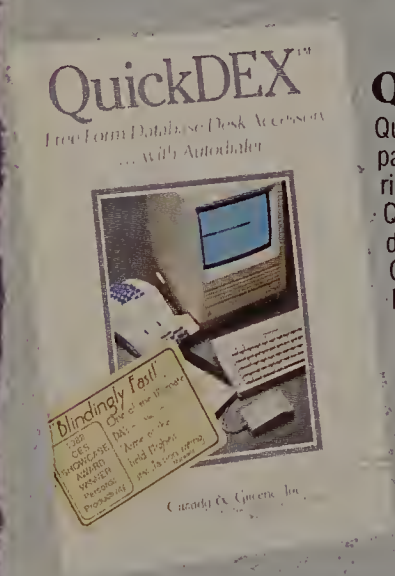
Norton Utilities for the Mac gives you an unbeatable combination of disk and data recovery software, along with disk optimization utilities. Now you can keep your valuable disks and data safe, secure and operating smoothly. It provides three levels of unerase, designed to give you optimal recovery options. The advanced diagnostic routines dig deep into the Mac operating system tool box to search for and recover lost data in minutes. With the Norton Utilities you can even unformat an accidentally-formatted hard disk. You also get Speed Disk, a powerful disk defragmenter and optimizer to significantly increase system performance by reducing data access time.

Symantec — LIST $129

#3279 Norton Utilities $83



Quick Dex



QuickDEX is the fast and painless way to keep your data right under the Apple menu. QuickDEX stores data in "card decks." Eight fit in the QuickDEX menu, but you can have as many as memory allows. Files are compact and searches are speedy. QuickDEX is also smart enough to find and dial the phone number on a card when click you the Dial button. It also prints Rolodex cards and mailing labels. Requires 512K or higher.

Cassady & Greene — List $60

#1670 QuickDEX $33

FolderBolt and NightWatch

Two powerful modular security systems to give you unsurpassed data protection. FolderBolt provides easy-to-use protection for Macintosh folders and is fully integrated into the desktop. Select a folder and it prompts for a password! Includes many options. NightWatch is the most widely-used system for Macintosh hard disk security that works like your bank teller machine card. Compatible with any Mac hard disk. A snap to use.

Kent-Marsh, Ltd.

#0258 FolderBolt $58
#1817 NightWatch $84

Mac Zone's Choice for Security

MaccessCard Reader and FileGuard

The MaccessCard Reader is a very convenient security add-on for your Mac. Working in tandem with FileGuard 2.5 software, it controls access to your Mac using magnetically-striped cards and an (optional) access key. You can use the cards that come with the system or quickly train it to recognize any ID card, such as your VISA, ATM, company or student ID card. After a registered user turns on your system with the MaccessCard Reader, FileGuard continues to control access to your Mac's hard disk, partitions, folders, files, applications, desktop, etc.

ASD Software

#0412 Maccess/FileGuard Bundle $395
#0161 MaccessCard Reader $295
#3286 FileGuard 2.5 .....$138
#3322 FileGuard 2.5 Office Pack 5 ...$348
#3323 FileGuard 2.5 Office Pack 10 .$578

The Mac Zone
Established 1986

Ultimate SE & Classic Case

Put your Mac SE into either the Ultimate SE or Classic Case and you can take it anywhere. This premium quality case pampers and protects your SE with half-inch high density foam padding. The sturdy DuPont Cordura nylon exterior looks great and keeps the weight down. Inside you'll find padded compartments for your keyboard (any model), mouse, external hard disk and cables. Two exterior pockets hold everything from manuals and floppy disks to sweaters and umbrellas.

I/O Design — List $130

#3797 Ultimate Black $78
#3791 Ultimate Navy $78
#3793 Classic/SE Black $64
#3907 Classic/SE Blue $64

Uninterrupted Power Supply

The power to protect your Mac. APC's UPS110SE and UPS370ci not only to provide better line filtering and surge suppression than most surge suppressors, but they also deliver backup power during ACX line failures -- giving you enough time to perform a safe shutdown. The UPS 110SE is sized for (and slides right under) a SE, SE/30 or Classic. The UPS370ci fits under your MacII monitor and is sized to power a Mac ci or fx with a two-page monochrome monitor. APC also offers a complete line of more powerful UPS systems and PowerChute, a UPS monitoring program for AppleShare Networks.

American Power Conversion

#2464 UPS 110 SE $208
#0305 UPS 370 CI $328

HardTop Keyboard Covers

Protect your keyboard from dust, major spills and falling objects. Hard plastic cover in attractive design. Fits easily over your keyboard.

Basic Needs, Inc.

Hard Tops

#0109 Mac Plus KB $15
#0110 Mac LC KB $15
#0111 Mac Standard KB $15
#0113 Mac Extended KB $16
#0123 DataDesk 101 KB $16
#0124 Apple Imagewriter II $15

Nylon Dust Covers

Basic Needs Nylon Dust Covers protect your computer and printer against dust and spills. They look great because they are machine-stitched and custom-fitted to your equipment. The platinum colored covers are made of washable, rip-stop nylon which is anti-static and won't crack, yellow or fade like similar priced vinyl.

Basic Needs Inc.

Keyboard Covers

#0044 Mac Classic w/LC KB $16
#0058 Mac Plus w/Plus KB $16
#0089 Mac IIcx/ci 13" Monitor Ext KB $17
#0030 Mac SE w/Std KB $16
#0127 Utility Pac $15

The Mac Zone
Established 1986

ACCESSORIES

1•800•248•0800

LaserWriter Toner Cartridges

Supreme Office andComputer

#2732 IINTX $104
#3733 PLUS $89

Teakwood Disk File

Kalamar storage cabinets protect your valuable 3.5" floppy disks from dust and other harmful influences. At the dame time, they dress up your desk and office. These handcrafted cabinets are made of solid teakwood and have a capacity of 45 disks.

Kalmar List: $30

#1117 Teakwood Disk File $14

MacBag SE/30 Classic

MacBags are designed to carry all the needs of an accountant to an engineer while still fitting under most airline seats. MacBags are made of strong, durable nylon that are padded to protect your Mac and accessories, while still looking attractive

Linebacker List: $100

#2089 MacBag SE/30 Wine $69
#2090 MacBag SE/30 Gray $69
#1352 MacBag SE/30 Navy $69

Targus Premier Macintosh Case

Premier Macintosh Case is perfect for the Mac SE and Classic. Features padded compartment for your Mac, external hard drive and removable padded case for the extended keyboard. Portfolio section provides Velcro-secured disk pockets, mouse and cable pockets and pen and business card holders. "Zilicone" treated Oxford nylon outer shell is water repellant, scuff resistant and won't wear against clothing. Removable shoulder strap with hand grips. Two layers impact-absorbing foam. Rivets at stress points. Nonskid, shock-absorbing rubber feet. Free running nylon zippers. PVC-backed materials throughout provide anti-static qualities. Padded exterior. Lifetime replacement warran
Available in black, navy, burgundy and gray.

Targus List: $130

#2630 Premier Case $68

The Mac Zone
Established 1986

Part #	Description	Price
Accounting and Finance		
[illegible]6	Accountant Inc. Pro	338
[illegible]6	ACCPAC Bedford Mac 1.2	138
[illegible]4	At Once!	284
[illegible]9	Business Sense 1.3	128
[illegible]	Cash Ledger	114
[illegible]2	Checkwriter II 3.2	31
[illegible]63	Computerized Classic Actg	224
[illegible]4	Dollars And Cents 5.0	62
[illegible]81	For The Record 2.0	30
[illegible]	MX Business Expense Report	47
[illegible]8	MX 000 Expense Reports	47
[illegible]9	MX GSA Expense Reports	47
[illegible]27	MX Payroll Tax Assistant	88
[illegible]32	MX Personal Tax Analyst Mac	47
[illegible]2	In House Accoutant	135
	[illegible]ht Expert Series - Peachtree	
[illegible]95	Accounts Payable	519
2596	Accounts Receivable	519
25[illegible]7	General Ledger	519
[illegible]804	General Payroll	519
2599	General Time Billing	519
2598	Inventory	519
2814	Invoice It	48
3535	M Y O B. 2.0	141
1582	MacMoney 3.5	58
0033	Managing Your Money 4.0	134
2410	Multiledger 2.0	234
1871	Payroll 4.0	108
2591	Quicken 1.5	37
2512	Timeslips III 2.0	194
1875	Ultimate Payroll 4.5	188
1872	Ultimate Payroll Multi-Co.	309
2798	Wall Street Investor	395
3769	Wealthbuilder	98
0481	Will Maker 4.0	35
Business & Presentation		
3605	4th D 2.1 Compiler	894
3331	4th D 2.1 Runtime 4 User	248
3332	4th D 2.1 Runtime Sngl User	79
2648	4th Dimension 2.1	488
3973	4th Dimension Write	228
04[illegible]1	4th Dimension Calc	228
2072	Acta Advantage	62
0115	Address Book Plus 2.0	51
1943	AEC Information Manager	398
3624	Alarming Events	83
2424	Aldus Persuasion 2.0	328
[illegible]28	Atlas * Mapmaker 4.5	368
3552	Avery Mac Label Pro	47
3013	Buck Mailer 3.2.3	74
3910	Business Plan Toolkit	95
3436	C.A.T. 3.0	288
3631	Calendar Creator	34
3[illegible]97	Contact Ease	245
2210	Data Desk 3.0	458
2074	Database 1.5	66
3291	Deltagraph 1.5	128
3455	Desk 3.03	228
3555	Direct Mail	50
[illegible]609	Double Helix III 3.0R6	388
0[illegible]19	DynoDEX 2.0	71
3977	Dynopage	72
3465	Endeavour Planner	88
0075	Exploring Microsoft Works	17
1382	Expressionist 2.03	78
2498	Exstatix 1 2	218
3371	Fast Envelope 1.0	44
1521	Fast Forms 2 0	104
33[illegible]	Fast Label 2.0	44
3456	Fasttrack Schedule 1.5	138
3330	Freeforce 1.0.1	248
34[illegible]8	Filemaker Pro	214
3987	Flexigraph/ Flexitrace	225
3373	Flexigraphs 1.1	120
1357	Flexitrace	145
2581	Foxbase II/Mac 2.01	288
2582	Foxbase+/Mac Multi User 2.0	408
2011	Full Impact 2.0	145
0226	GeoVista	169
3565	How To Write A Business Plan	85
3836	I Think	375
3530	Ifix SF-171 Fed. Employ. App	31
3722	Informed Designer 1.0.4	158
0101	Informed Manager	98
3990	Informed AutoForm	74
2686	Key Plan	238
2917	Kiwi Envelopes!	32
3989	LISI Sales & Marketing Mgr	295
3142	Mac Envelope 5.0	56
2805	Mac Envelope Plus 2.0	158
1159	Mac Flow 3.5	168
2202	Mac Project II 2.1	358
3089	Mac Schedule 2.0	138
3931	Mac Schedule Plus 1.0	198
0070	Mac Spin	168
3983	Mariah	85
3524	Mathematica Enhanced	648
3523	Mathematica Standard	448
0998	Micro Planner Plus 6.X	359
0227	Microsoft Excel 3.0	299
0557	Microsoft File 2.0	123
2678	Microsoft Office	524
1220	Microsoft Powerpoint 2.01	244
0567	Microsoft Works 2.0c	183
2007	More 3.0	264
2538	Omnis 5 1.104	648
3612	Planisoft	138
3613	Planisoft - 5 Pack	574
3614	Planisoft - 10 Pack	838
2195	Power Macros For Excel 2.2	33
3760	Record Holder Plus	84
0406	Smart Alarms 3.0 Single	63
1247	Smart Alarms 3.0 1-4	124
2315	Smart Alarms 3.0 5-8	188
0042	T/Maker Smart Bundle	214
0032	Statview II	278
0066	StatView SE+Graphics	198
2420	Sticky Business	50
0401	Sticky Business Plus	86
0069	SuperANOVA Mac II	308
0068	SuperANOVA SE/Plus	308
3882	Theorist 1.1	250
3908	Touch Base	88
2224	Wingz 1.1a	244
1653	Works Plus Command 1.1	65
1236	Works Plus Spell 2.0	55
Word Processing		
2155	Big Thesaurus	63
1129	Coach Professional 3.1	123
1127	Comment 2.0	63
3813	Correct Grammar 2.0	49
2847	Docucomp 1.5	88
3944	Editorial Advisor	74
0416	Elements of Style	33
0010	Franklin Language Master 2.0	44
3772	Full Write Pro 1.5	145
3143	Grammatik Mac 2.0	49
0437	Inside Information	67
3201	Letter Writer Plus	51
1123	Mac Proof 3.2.3	114
2485	MacWrite II 1.1	138
3405	Magic Typist	49
3479	Nisus 3.01	244
1892	Procite	195
438	Random House Encyclopedia	67
3103	Resume Expert	47
3243	Resume Expert - Cover Letters	47
3452	Stylist	49
3984	Taste	83
0433	The Resume Kit	25
3941	Thunder 7	56
2188	Vantage 1.5	50
2238	Word 4.0	244
1501	Wordfinder	33
3972	Wordperfect Mac 2.0	278
2052	Writenow 2.2	116
Graphics & Design		
3558	Adobe Illustrator 3.0 w/ATM	348
2647	Adobe True Form	249
3092	Adobe Type Align	64
3497	Adobe Type Manager 2.0	58
3898	Aldus Design Team	868
3223	Aldus Pagemaker 4.0	498
3461	Aldus Pre Print	328
3620	Amazing Paint	64
3294	Art Importer 2.0	84
3970	BannerMania	36
1497	Calandar Maker 3.0	31
3135	Canvas 2.1	188
0174	Capture 4.0	69
0173	Clickpaste 2.0	59
3377	Colorset 1.5	170
3216	Colorstudio	598
1237	Comic Strip Factory	36
1394	Comic People Vol. 1	20
3227	Comic People Vol 2	20
3217	Designstudio	488
3454	Deskpaint/Deskdraw 3.0 3	112
3881	Digital Darkroom 2.0	258
3761	Dyna Perspective 2.0	599
3862	Easy Color Paint	44
3320	Evolution	54
3553	Exposure Pro	68
0022	Fontographer 3.2	258
3218	Fontstudio	358
3947	Freehand 3.0	398
3582	Frame Maker	795
2854	Icon-it	44
3525	If:X Froms Designer 1.0	168
1925	Imagestudio	138
2006	Kaleidagraph 2.0	144
3994	Kid Pix	29
2143	Letrastudio	274
0030	Mac Renderman	548
3705	Mac Vision Video Digitzer	258
2201	MacPaint II 2.0	89
3983	Mariah	85
3551	Master Color	98
3550	Masterpaint 1.0	50
3321	Metamorphosis	84
3033	Model Shop	374
0053	Multi-Ad Creator	455
3895	Olduvai Video Paint	278
3435	Pantone Color Book	48
3880	Personal Press 1.0	198
3199	Photo Shop	498
3774	Picture Link 1.0	219
1576	Pixelpaint 2.1	148
2665	Pixelpaint Pro 2.0	458
1015	Print Shop	34
3798	Publish It Easy 2.0	143
3488	Quark Xpress 3.0	518
2437	QuarkStyle	188
1370	Readysetgo! 4.5	164
0054	Search	115
2205	Smartform Designer	288
1091	Smartscrap & The Clipper 2.0	55
4001	StrataVision 3D	348
3971	Streamline 2.0	118
3594	Studio /32	448
3827	Studio 8 2.0	188
2516	Studio/1	55
1379	Super 3D 2.1	338
1997	Superpaint 2.0	134
2650	Swivel 3D 1.1	294
3619	Swivel 3D Professional	434
3852	Swivel Art 3D	81
3132	Typestyler 1.5	114
2908	Ultrapaint	124
3909	Ventura Publisher For Mac	498
Fonts & Clip Art		
	3G Graphics - Images with Impact	
3192	Accents and Boarders	64
2085	Business 1	64
1617	Graphics & Symbols	49
0421	People 1	99
	Adobe	
2870	Plus Pack for ATM	108
3280	Type Reunion	37
3210	Type Set 1	64
3211	Type Set 2	64
3491	Type Set 3	134
2431	Smart Art 1	64
2620	Smart Art 2	64
2621	Smart Art 3	64
3484	Smart Art 4	64
3950	Type on Call	47
	Adobe Fonts -Top Sellers	
2331	6 Optima	124
2334	9 ITC Garamond	124
2338	13 Helv Lt & Helv Black	124
2339	14 Helvetica Condesed	238
2344	19 ITC Korinna	124
2345	20 Goudy Old Style	124
2346	21 Sonata	62
2351	26 Bodoni	124
2358	33 Stencil, Hobo & Brooms	94
2359	34 Aachen-Revue-U Roman	124
2364	39 Futura Light	178
2371	46 Futura	178
2372	47 Futura Condensed	238
2375	50 Helvetica Compressed	94
2382	57 ITC Kabel	124
2383	58 Ocr-a, Ocr-b, Micr	94
2384	59 Helvetica 1	124
2574	90 A Bocklin, F Franktur	124
2671	100 Adobe Garamond	178
2672	101 Adobe Gar Expert Col	124
3148	110 Nuptial/Cascade/Medival	94
3153	115 Kunstler Script	94
3154	116 Industria	124
3156	118 Bodoni II	124
3159	121 Lithos	124
0220	122 Wood Type 1	124
3437	123 Tekton	94
3389	142 ITC Century Condensed	238
3390	143 Minion	238
3711	150 ITC Garamond 2	124
3713	152 Gill Sans	178
3703	153 Serpentine	178
3720	160 Wood Type 2	124
3721	161 Bembo	124
3864	162 Gill Sans 2	124
3874	173 ITC Fenice	238
3958	180 Adobe Caslon	178
3969	190 Helvetica Neue Cond 3	178
	Bitstream	
0396	Font Pack 1 - True Type	58
0397	Font Pack 2 - True Type	58
	DreamMaker	
3998	Cliptures: Business Vol 1	67
3999	Cliptures: Business Vol 2	67
4000	Cliptures: Sports Vol 3	67
3996	MacGallery (Hypercard Ver)	26
3995	MacGallery (MacPaint Ver)	26
	Dubl-Click WetPaint	
1100	Classic Vol 1 & 2	39
1868	Publishing Vol 3 & 4	39
1869	Animals Vol 5 & 6	39
1870	Special Occ Vol 7 & 8	39
1878	Printer's Vol 9 & 10	39
1879	Industrial Vol 11 & 12	39
1880	Old Earth Vol 13 & 14	39
1881	Island Life Vol 15 & 16	39
2318	The People Vol 16 & 17	39
1342	World Class Fonts Vol 1 & 2	39
1882	World Class Fonts Vol 3 & 4	39
1883	World Class Fonts Vol 5 & 6	39
2319	World Class Fonts Vol 7 & 8	39
	NEC	
0077	Type Gallery/COR-36 Drive	475
0082	Photo Gallery	245
0081	Image Gallery	245
0080	Type Gallery	245
0085	Clip Art 3D	245
	T/Maker - Click Art	
3334	Click Art Business Cartoons	31
1052	Click Art Business Images	31
0754	Click Art Holidays	31
3460	Click Art Christian Images	38
3606	EPS Animals And Nature	82
3459	EPS Business Art	82
2012	EPS Illustrations	82
0326	AGFA Type on CD ROM	61
0381	AGFA Type w/Porta Drive CD	689
2856	Artclip 1st Edition	49
2857	Artclip 2nd Edition	64
2859	Artfonts Pak	49
0178	Business Images (Clip Art)	79
0315	Fluent Laser Font Library 4.0	99
0078	Font Monger	62
3559	Math Type	88
3560	Para Font	58
MultiMedia		
3974	Animation Works	122
3277	Computer Eyes - Color	348
3278	Computereyes - B/W	194
3850	Film Maker	434
2918	Interface	248
2982	Macromind Accelerator	124
2583	Macromind Director 2.0	628
3851	Macromind Media Maker	488
3470	Media Tracks	188
3471	Media Tracks Multimedia Pk	318
0180	Quick Image 24 Bundle	649
0208	QuickView Studio	1795
3483	Raster Ops TV Tuner	375
3482	Raster Ops Video Expander	525
Drafting and CAD		
3289	Blueprint 2.0	218
3693	Claris CAD 2.0	644
	Design Your Own Home	
3609	Architect	64
3610	Interiors	64
3611	Landscape	64
2015	Dreams	418
2225	Generic Cadd Level 1	83
3679	Generic Cadd Macintosh	374
0429	MacDraft 2.1	278
2200	MacDraw II 1.1	284
3540	MiniCAD Plus 3.1	585
3468	Relational Objex	148
2646	Versacad Drafter	525
Entertainment		
0067	22nd Street Whist	31
3599	3 In Three	31
3849	Curse Of The Azure Bonds	38
2727	AD&D Pool Of Radiance	32
1948	Ancient Art Of War At Sea	25
3597	Armor Alley	33
3016	Arthur-Quest For Excalibur	28
1967	Balance Of Power 1990	29
2519	Bard's Tale	19
1376	Beyond Dark Castle	32
3604	Blockout (B&W Only)	26
2830	Bomber 2.0 W/Headphones	31
2471	Casino Master B & W	40
2470	Casino Master Deluxe Color	44
2651	Chessmaster 2100	30
1893	Chuck Yeager's Flight Trng	31
3129	Citadel	26
3480	Citadel W/Secrets	30
1968	Colony	30
2528	Cosmic Osmo	39
2728	Cribbage King/Gin King	25
1124	Crossword Magic	28
1523	Crystal Quest 2.2	28
1945	Crystal Quest w/Critter Editor	44
0689	Dark Castle	31
3494	Darwin's Dilemma	31
3809	Faces...Tris III	23
1808	Falcon 2.2	29
2756	Fastbreak	27
0088	Ferrari Grand Prix	31
0565	Flight Simulator 1.02	33
2511	Gauntlet	24
3595	Global Dilemma/Guns&Butter	33
2757	Grand Prix Circuit	27
3008	Halls Of Montezuma	28
3600	Harpoon	39
0304	Harpoon - Battle Set #2	22
0306	Harpoon - Battle Set #3	22
0308	Harpoon Scenario Editor	28
3596	Hostage	27
2288	Hunt For Red October	20
3598	Indiana Jones - Last Crusade	33
3806	Ishido: Way Of Stones	33
3335	Jack Nicklaus Greatest 18	35
0099	Jack Nicklaus Greatest Bundle	44
0474	King's Bounty	32
2527	Leprechaun	27
2735	Life And Death	31
0307	Loom	29
3601	Loopz	33
1813	Lunar Rescue	32
0255	Mac Rummy	31
3625	Mac Ski	38
0650	MacGolf	33
1984	MacGolf Classic	51
0255	MacRummy	32
2235	Manhole	27
2221	Mean 18	25
2923	Micro League Baseball II	37
2730	Might & Magic II	38
3463	Mission Starlight	28
2062	Moebius	24
3290	Moriarty's Revenge	31
3580	Nemesis Deluxe	84
2892	Nemesis Go Master	41
2893	Nemesis Joseki Genius	26
3581	Nemesis Tactical Wizard	34
0191	Nemisis Jr.	20
0895	NFL Challenge	54
0240	OIDS	29
1978	P-51 Mustang Flight Sim	35
2737	Panzer Battles	28
2887	Pipe Dream	16
0473	PGA Tour Golf	38
2164	Pirates!	34
2983	Playmaker Football	28
2557	Puzzle Gallery	28
2069	Road Racer	37
0145	RoboSport	37
2888	Sands Of Fire	32
1916	Sargon IV	27
1024	Scrabble	23
2063	Shufflepuck Cafe	24
3800	Sim Earth Planet Simulator	39
2300	Simcity 1.2 B&W	28
2747	Simcity Color	46
3462	Sky Shadow	28
0261	Solitaire DA	23
1622	Solitaire Royale	19
2980	Space Rogue	30
3175	Starflight	39
3829	Stratego	35
3112	Synchronicity	48
2909	Taskmaker	26
3934	Tessare	31
1980	Tetris (B&W And Color)	21
3284	The Playroom	28

Part #	Description	Price
1536	Trust & Betrayal	21
0584	Uninvited	24
3808	Vette!	32
3602	Weaver Baseball 1.5	33
3110	Welltris	21
Where Is Carmen San Diego?		
2749	Where In Europe?	28
2488	Where In The U.S.A.?	28
2186	Where In The World?	28
3513	Where In Time?	28
1628	World Class Leader Board 4.0	26

Education

Part #	Description	Price
3587	Accu-Weather	49
1438	Adobe Illustrator Design Book	22
3848	Alge Blaster Algebra Plus	35
1527	Algebra	39
1614	Alphabet Blocks 1.10	29
1910	Arithmetic	39
0415	At Your Service	30
1986	Calculus	59
1532	Discrete Mathematics	39
3661	Earthquest	48
0246	GEMS of the Word KJV	25
0245	GEMS of the Word NIV	25
0892	Geometry	59
0247	Hyper Bible 2.0 KJV	124
0248	Hyper Bible 2.0 NIV	124
1395	Hypercard Handbook 2.0	21
3206	Hypercard Script Lang Guide	18
Hyperglot Software - Language Training		
Spanish		
3740	Pronunciation Tutor	34
3739	Tense Tutor	41
3738	Verb Tutor	38
3737	Word Torture 4.0	34
French		
3742	Pronunciation Tutor	34
3744	French Tense Tutor	41
3743	French Verb Tutor	38
3741	French Word Torture 4.0	34
German		
3746	German Pronunciation	34
3747	German Verb Tutor	38
3745	German Word Torture 4.0	34
Italian		
3748	Word Torture 4.0	34
Russian		
3733	Introduction to Russian	28
3735	Russian Noun Tutor	58
3734	Russian Verbal Aspects	41
3732	Russian Word Torture 4.0	34
Japanese		
3750	Japanese Easy Kana	128
3749	Japanese Kanjimaster	98
Learn to Speak - Series		
3892	French CD ROM	60
3893	Spanish CD ROM	60
3758	Individual Trng Pagmkr 4.0	34
1585	Inside Macintosh Vol. 1	18
1586	Inside Macintosh Vol. 2	18
1587	Inside Macintosh Vol. 3	18
1588	Inside Macintosh Vol. 4	18
1629	Inside Macintosh Vol. 5	18
1969	Inside Macintosh X-ref	8
0260	Interactive Physics 1.2	188
2753	Kidsmath	25
0357	Kidstime	25
3751	Lifeguard	38
0021	mac Bible Greek	98
0023	mac Bible Hebrew	98
0017	mac Bible KJV	58
0016	mac Bible NIV	58
0018	mac Bible NRSV	58
3816	Mac Bible - Combo Pack	29
3815	Macintosh Bible What Now?	24
3814	Macintosh Bible 3rd Ed	18
3200	Macintosh Prog Primer	21
2473	Macintosh Prog Secrets	19
3101	Mackids Preschoolpack	34
2439	Mastering Wingz	17
0224	Math Blaster	28
0223	Math Blaster Mystery	28
2593	Math Rabbit	30
2736	Mavis Beacon Teaches Typing	31
0072	Number Munchers	28
2445	Numbermaze B&W	25
0074	Oregon Trail	28
Penton Overseas - Vocabulearn		
2838	Vocabulearn Spanish 1	35
2927	Vocabulearn Spanish 2	35
2837	Vocabulearn French 1	35
2926	Vocabulearn French 2	35
2836	Vocabulearn German 1	35
2925	Vocabulearn German 2	35
2839	Vocabulearn Italian 1	35
2928	Vocabulearn Italian 2	35
2840	Vocabulearn Japanese 1	35
2929	Vocabulearn Japanese 2	35
3847	Personal Trainer For The SAT	35
Personal Training Systems Training for		
Word 4.0		
3051	Beginning Level	51
3052	Intermediate Level	51
3053	Advanced Level	51
3054	Additional Features	51
Works 2.0		
3071	Database and Form Letters	51
3072	Advanced Databases	51
3073	Spreadsheets	51
3074	Word Processing	51
PageMaker 4.0		
3055	Beginning PageMaker	51
3056	Intermediate PageMaker	51
3057	Tips & Techniques	51
3058	Advanced Features	51
3383	What's New for 4.0 - Part 1	51
3384	What's New for 4.0 - Part 2	51
Freehand 3.0		
3059	Beginning Freehand	51
3060	Intermdate Freehand	51
3061	Creating Special Effects	51
0548	Precision Drawing Techniques	51
3062	Additional Features	51
Aldus Persuasion 2.0		
3067	Beginning Persuasion	51
3068	Intermediate Persuasion	51
3069	Creating AutoTemplates	51
3070	Creating Artwork	51
FileMaker Pro		
3076	Creating a Database	51
3077	Beginning Layouts	51
3078	Tips and Techniques	51
3923	Advanced Features	51
Hypercard		
3047	Using Hypercard	51
3048	Creating Cards and Stacks	51
Microsoft Excel 3.0		
3034	Beginning Spreadsheets	51
3035	Intermediate Spreadsheets	51
3036	Advanced Spreadsheets	51
3037	Powerful Spreadsheets	51
3038	Creating Business Graphs	51
3039	Macros	51
3040	Advanced Macros	51
QuarkExpress 3.0		
3783	Beginning Xpress	51
3784	Master Pages	51
3785	Text Formats	51
3786	Color & Type	51
3787	Tips & Techniques	51
1985	Physics	59
1529	Pre Calculus / Trigonometry	39
1531	Probability Theory	39
3988	Professor Mac	29
2864	Prog Online Companion 2	35
1856	Reader Rabbit 2.2	30
0383	Score Improvement S.A.T.	57
0225	Speed Reader	28
0071	StatView Student	63
0250	System 7 Revealed	18
1941	Talking Tiles 1.0.2	25
0186	The Word Processor KJV	145
0188	The Word Processor NKJ	145
0189	The Word Processor RSV	145
0187	The Word Processor NIV	145
1530	True Basic Calculus 3.02	39
1533	Truestat	39
1931	Turbo Math Facts	22
2086	Type!	17
3759	Typing Encore 3.5	17
0694	Typing Tutor IV	28
3027	Voyager 1.2	86
0073	Word Munchers	28
3102	Word Quest	30
3589	World Atlas	38

Music

Part #	Description	Price
3453	Band-in-a-Box	57
3187	Concertware + MIDI V5.0	97
0257	Dlx Music Constr. Set 2.5	83
3127	Finale 2.5	548
1612	Jam Session	28
1958	Mac Drums	30
OpCode Systems		
3937	EZ Vision	99
3939	MIDI Play	42
3938	MIDI Translator	42
3128	Musicprose 2.0	298
Passport Designs		
0309	AudioTRAX	151
0312	Desktop Music Creativity CD	164
0313	Encore	378
0310	HyperMusic MIDI Player	44
2828	Mastertracks Pro 4.0	318
1355	MIDI Interface	79
2607	Note Writer II	295
0311	Sound Apprentice	164
0303	TRAX	58
2442	Perceive	49
2500	Performer 3.5	375
1479	Practica Musica 2.2	68
0539	Professional Composer 2.3	375
2860	Sound Clips 1	48
2861	Sound Clips 2	48
3626	Sound Clips 3	48
3627	Sound Clips 4	48
3457	Sound Exciter	48
1973	Super Studio Session 2.0	64

Programming

Part #	Description	Price
2071	Just Enough Pascal	51
3431	Prograph 2.0 W/Compiler	244
1473	Qued-M	85
2054	Quick Basic 1.0	63
Serius Corporation		
3408	Serius Developer	339
3409	Serius Programmer	210
3410	Animation Objects	64
3411	Communication Objects	64
2844	Smalltalk/Vmac	123
0915	Think C 4.0	164
3225	Think Pascal 3.0	164
1884	TMON 2.8.4	85
1834	True Basic 2.02	54
1207	Visual Interactive Prog	85
1964	Zbasic 5.0	98

Hyperware & CD'S

Part #	Description	Price
3985	AddMotion	182
3506	All Of Mac Tutor CD	155
3510	Baseball Guide and Reg CD	155
0241	88$ in a Box CD	78
3863	CD Funhouse	39
0150	CD7 CD	49
3493	Cosmic Osmo CD	45
0244	Down to Earth CD	155
3507	Disc Tracy Prog Detect CD	85
0472	Front Page News CD	89
3512	GEM (Public Domain) CD	75
0152	GigaROM CD	98
1462	Hyper Dialer	30
3843	Hypercard 2.0 Dev Kit	139
2809	Hyperda 1.2	44
3466	HyperHIT I	118
3469	HyperHIT II	239
2525	HyperTMDN	57
3777	Icon Factory 1.1	44
0242	Korean War CD	78
0151	Macademia CD	73
2541	Manhole CD	37
3472	Media Trks Multimedia CD	318
3233	Microsoft Office CD	598
0025	Middle East Diary CD	85
1970	Power Macros For Hypercard	34
3504	Duick Art CD	174
2782	Script Edit	43
3776	Script Expert 1.0	44
3775	Script Library 2.0	56
3505	Seals Of The US Govt. CD	55
2799	Spinnaker Plus 2.0	275
3492	Super Card 1.5	198
3509	The CIA World Factbook CD	78
3508	The USA Factbook CD	85
0243	U.S. Presidents CD	25
3511	Vietnam Remembered CD	78
2784	Xcal	70

Storage Devices

Part #	Description	Price
Applied Engineering		
3671	3.5" 800K Floppy Drive	195
3672	3.5" HD 1.44Mb Floppy Drive	228
Cutting Edge		
0253	3.5" 800K Floppy Drive	125
3297	20 MB	328
3298	30 MB	388
3299	45 MB	438
3301	45 MB Removable	589
3425	60MB	488
3300	80 MB	528
DataCell		
0405	52MB OLPS	399
3683	105MB O	679
3685	170MB O	928
2161	EMAC 150 Tape Backup	715
2047	EMAC 60 Tape Backup	649
IDS Livingstone		
0144	Clipper 20MB	428
0165	Pro Drive 40MB	339
0166	Pro Drive 80MB	449
0167	Pro Drive 130MB	595
0168	Pro Drive 180MB	885
0169	WIP Drive 40MB	379
0170	WIP Drive 50MB O LPS	479
0171	WIP Drive 100MB O LPS	819
0172	WIP Drive 120MB	739
La Cie		
3948	Tsunami 50 MB LPS	599
3696	Tsunami 80 MB	815
3949	Tsunami 100 MB LPS	915
3697	Tsunami 105 MB	865
3699	Tsunami 170 MB	1225
3700	Tsunami 210 MB	1325
Mass MicroSystems		
0175	Data Pack	724
0176	Data Pack IICX	778
0177	Data Pack MO	3424
0164	MO 512 Cartridge	208
0215	Double-Up Board	167
NEC		
0079	Intersect CDR-73	659
2869	Intersect CDR-36	469
0076	CDR-36 Battery Pack	95
PLI		
3687	Superfloppy 1.4 (1.4/800)	448
2298	Turbofloppy 1.4 (1.4 Only)	308
2181	Infinity 40 Turbo Rem	748
2182	Infinity 40/40 Twin Rem	1475
0182	Infinity 88 Turbo	1495
0183	Infinity 88 Cartridge	174
2851	Infinity Optical 600MB	3794
3269	Turbo 250MB	1750
3270	Turbo 300 MB	1995
3281	Turbo 600 MB	2595
3691	CD-ROM Drive	775
3690	DAT Backup System	2299
Storm Technology		
3993	Picture Press	120
0179	Picture Press Accelerator	653
3767	Porta Drive CD ROM Drive	648
2183	Syquest 44 MB Cartridge	74
3536	Toshiba XM 3201A CD ROM	795

Upgrades Accelerators & Boards

Part #	Description	Price
Applied Engineering		
3824	MacRam Classic Upgrade	118
3674	Mac Ram Port Upgrade Kit	395
0289	Cache-In	194
3673	Quadralink	208
DayStar		
2717	PowerCard 030 25mhz	1095
2432	PowerCard 030 33mhz	1240
2623	PowerCard 030 40mhz	1389
2559	PowerCard 030 50mhz	1895
PowerCache		
3810	40Mhz IIci w/FPU	1165
3770	40Mhz IIci w/o FPU	948
3811	50Mhz IIci	1688
3812	50Mhz IIci w/FPU	1950
2877	Fast Cache IIci	278
Dove		
963	MacSnap 524XE	198
964	MacSnap 524XS	248
3228	Marathon 030 Mac II	528
3230	Marathon 030 Mac Plus	528
3821	Marathon 030 SE/30	528
1260	SCSI Port Adapter	129
Orange Micro		
0230	Orange Peripherals Kit	149
0059	Orange 386 20Mhz	1831
3562	Orange 386SX 16Mhz	1695
0230	Orange Peripherals Kit	149
1485	Mac 286 v3.0 (Sngl Brd)	1078
3032	Mac 86 co-processor SE	265
Total Systems		
Mercury		
0036	030 16mhz (Plus)	5
0034	030 16mhz w/FPU	6
0043	030 16mhz (SE)	3
0041	030 16mhz w/FPU (SE)	5
0048	32-bit SCSI Module (Plus)	1
0049	RAM Module	2
0050	Mercury Kit (Plus)	
Gemini		
2902	030 20Mhz	7
3633	030 20mhz w/FPU	
2903	030 25Mhz	
3634	030 25mhz w/FPU	12
Gemini II		
0045	030 33Mhz w/o FPU	11
3635	030 33mhz w/FPU	15
0047	030 40Mhz w/o FPU	13
3752	030 40mhz w/FPU	18
0051	030 50Mhz w/o FPU	15
3638	030 50mhz w/FPU	21
2899	Gemkit	1
Magellen 25Mhz 040 w/PMMU & FP		
0292	Mac SE/30	19
0291	Mac IISI	19
SIMMS		
3936	IISi 2MB (Qty 4)	68
3428	1MB 80ns (Qty 2)	9
3579	1MB 80ns FX	24
3586	1MB for LaserWriter NTX	4
0263	Maxima	
3584	4MB for 020 (Qty 4)	138
3583	4MB for 030 (Qty 4)	107
3585	4MB for FX (Qty 4)	138
0014	LC 2MB	34
3976	LC 4MB (Qty 2)	53
0007	SRAM Mac Portable 1MB	28
0008	SRAM Mac Portable 2MB	54
0009	SRAM Mac Portable 3MB	79
2654	Virtual - SE/30, IIx, IIcx, IIci	11
2652	Virtual Mac II w/PMMU	18

Modems and FAX

Part #	Description	Price
Abaton		
2154	Abaton Interfax 12/48	2
2987	Abaton Interfax 24/96	3
Applied Engineering		
DataLink Express - External		
0340	2400 Baud	1
3666	2400 w/MNP 5	19
3667	2400 w/MNP 5 & Send Fax	23
Macintosh II - Internal		
0341	2400 Baud	20
3668	2400 w/MNP 5	23
3669	2400 w/MNP 5 & Send Fax	26
Macintosh LC		
3980	Mac LC 24/96 SendFax	24
3981	Mac LC 24/96 w/v 42 bis	26
Macintosh Portable		
3670	2400 MNP 5 Sendfax Port	20
Compuserve		
0213	Mac Membership Kit	2
2625	Navigator 3.0	4
Hayes		
0386	Smartcom II 3.1	8
0451	Personal Modem	14
0452	Ultra 96 Package	92
Prometheus		
0062	ProModem Ultima	74
0212	ProModem 2400 MII	21
3134	ProModem 9600 v 42	79
3312	ProModem 2400 Mini	11
3313	TravelModem	20
3319	ProModem 24/96MSR	29
3608	ProModem 9600M Plus	69
3314	ProModem 2400SE	24
2849	Macknowledge	8
2553	Second Sight 2.0 Redrydhost	8
Supra		
2003	2400 Baud	11
0065	2400 Plus	17
3368	Supra 2400 MacPac	17
2075	Backfax	15
3665	Courier Host Dual Std V.42	99
1057	Courier Host Std V.42	67
3557	Double Talk Twin Pack	12
3318	Dove Fax 24/96	29
3514	Dove Fax Plus	39
2048	EMAC Md 2400 MNP 5	17
3621	Faxgate Plus 1.1	23
0028	Lexus 24008ps Mini Modem	
3615	MacModem V.32 MNP 9	
1902	Microphone II 3.0	2
3883	Teleport ADB 2400 MNP 5	1
0395	TelePort FAX 24/96	1

Part #	Description	Price
0643	Versa Term 4.1	86
0198	VersaTerm Pro 3.5	172
2881	White Knight 11	84

Networking and Connectivity

Asante
Mac II, IIx, IIcx, IIci, IIfx Ethernet

Part #	Description	Price
3641	MacCon + II E	269
3642	MacCon + II ET 64	304
3643	MacCon + II ET	269
0221	MacCon + IIET64	304

Mac IIsi and SE/30 Ethernet

Part #	Description	Price
0020	MacCon+ 30iE	269
3647	MacCon+ 30iE64	304
3646	MacCon+ 30iET	269
0228	MacCon+ 30iET64	304

Mac SE

Part #	Description	Price
3648	MacCon SE E	269
3649	MacCon SE ET	269

Mac LC

Part #	Description	Price
0029	MacCon + LC	269
0324	MacCon + LC MC	379
0325	FNLC 10T	269

10BaseT External Products

Part #	Description	Price
0327	EN/SC	359
3885	10T Hub	989
3945	10T MAU	99

Cayman Systems

Part #	Description	Price
0181	Gator 8ox CS	1955
3118	Gator Share Software	1350
3117	Gator Card E/II (II Series)	458
3120	Gator Mail O (10 Users)	675

Dayna Communications

Part #	Description	Price
3546	Etherprint	348
0321	EtherPrint Plus	625
3891	DOS Mounter 2.0	54

Farallon
Ethernet

Part #	Description	Price
3902	Ethernet Mac II Card	358
3904	Ethernet Mac II (10 Pk)	3258
3901	Ethernet SE/30 Card	358
3333	Star Controller EN 500	1588
3475	PhoneNET Star Conn. EN	120

PhoneNET Systems - Hardware

Part #	Description	Price
0829	Star Controller 300 Series	824
0831	PhoneNET Repeater	313
0832	PhoneNET - DIN-8	30
0828	PhoneNET - DIN-8-10 Pk	195
0955	PhoneNET - D8-9	30
2779	PhoneNET Star Connector	17
2751	PhoneNET Star Conn. - 10 Pk	125

PhoneNET Systems - Software

Part #	Description	Price
0827	PhoneNET Check Net	63
1639	Traffic Watch	124
2483	PhoneNET Liaison 3.0	258
0826	PhoneNET To Appletalk Adapter	8

Timbuktu

Part #	Description	Price
0420	Timbuktu 4.0	139
0422	Timbuktu 4.0-10 User Pk	719
0423	Timbuktu 4.0-30 User Pk	1429
0000	Timbuktu 4.0 Gold Plan 100+	Call
2418	Timbuktu Remote	122
2827	Timbuktu Remote Access Pk	844
2752	Remote Wakeup Mdm Cbl	31
3474	Portable Pak	328

Insignia Solutions

Part #	Description	Price
2506	Soft PC 1.3	241
3982	Soft PC Classic	125
3282	Soft PC EGA/AT	124
3664	Access PC	61

Nuvotech

Part #	Description	Price
3119	Nuvolink II	271
3115	Nuvolink SC	369
1225	Turbo Net - D8-9	19
1224	Turbo Net - DIN-8	19
3340	Turbo Net 12 Pack DIN-8	198
1929	Turbo Net ST - DB-9	29
1918	Turbo Net ST - DIN-8	29
3341	Turbo Net ST 12 Pk DIN-8	278
1226	Turbo Net-Appletalk Adapt	6
2184	Turbo8ridge	318
3121	Turbo Star (Nuvotech)	825

Orange Micro

Part #	Description	Price
1435	Grappler 9 Pin (C/Mac/GS)	86
2080	Grappler Mac LS	68
3015	Grappler Mac LX	133
1517	Grappler Mac to 512k Mac	26
3564	Grappler Plus	77
2430	Grappler Spooler	46

Shiva

Part #	Description	Price
3251	NetModem V.32 9600	1165
1615	NetModem V2400	338
2685	Fast Path IV	1885
1405	Net8ridge	405
1406	NetSerial	274
2542	Telebridge	408
2985	Ethergate	1618

Sitka TOPS

Part #	Description	Price
3167	Tops 3.0 Network Mac	186
3429	Tops Flashcard MC	195
1089	Tops Netprint 2.0	124
3477	Carbon Copy Twin Pack	188
3285	Carboncopy Mac Single	116
3992	Clear Access 1.3	350
3917	Dataclub 3 Pack	198
3918	Dataclub 10 Pack	525
0417	E-Help	210
0486	GraceLAN	217
3975	Lap-Link Mac Release III 3.2	92
2215	LT 200 MC Localtalk Board	295
2214	LT 200 PC Localtalk Board	185
3886	Mac To Mac 5 Pack	164
3887	Mac To Mac 10 Pack	218
0039	MacLink Plus PC 5.0 w/Cable	128
3111	Maclink Translators	108
3138	Quickmail 2.2.3 (1-5 User)	209
0142	Send Express (2 Pack)	56
0143	Send Express (5 Pack)	125
3894	Software Bridge Mac	78

Input & Output Devices

Abaton

Part #	Description	Price
0217	LaserScript LX	1745
0216	Color Scan 300	1795
2916	Soanner 8bit GS	1495
1507	Pro Point ADB (SE & II)	79

Caere

Part #	Description	Price
3659	The Typist	478
2158	Dmnipage 2.1	494
0120	OmniDraft	68
0418	OmniProof	104
0419	OmniSpell	68
3012	Cordless 4 Butn Cursr (Kurta)	64
3929	Dest Scanner w/OCR	685
3845	Diconix B&W Printer	398
2935	Felix	116
1990	Joystick (Premium III) ADB	41
0941	Joystick Quickstick (Plus)	41
3009	Kurta Tablet 8.5 x11	318
3010	Kurta Tablet 12x12	384
3011	Kurta Tablet 12x17	624
3629	Little Mouse A+ (512/Plus)	74
3630	Little Mouse For ADB	74
1584	Mac 101 Keyboard - ADB	128
2813	Mac Pro KB-105 ADB	144
3306	MacTrac Trackball 512/Plus	60
3305	MacTrac Trackball AD8	74
3485	Microtek 300GS	1325
3486	Microtek 300ZS	1935
0369	Microtek 600ZS	Call
0370	Microtek Slide Scanner	Call
2740	Mousestick	64
2741	Mousestick ADB	78
1390	Read It! OCR 2.1	277
2433	Read It! Personal 2.1	168
2561	Scanman Model 32	298
0055	Supermouse	89
3326	Switchboard	158
3780	Switchboard Track 8all	97
0256	TEFAX w/AutoFAX (Relisys)	869
3232	The Complete Full-Pg Scanr	755
3231	The Complete Half-Pg Scanr	294
1353	Thunderscan Power Supply	42
1242	Thunderscan Plus	198
2212	Lightning Scan 400	384
0149	True Color - Hand Scanner	575
1292	Turbo Mouse (512K & Plus)	107
1411	Turbo Mouse AD8	107
3412	Unmouse	180
3933	Voice Link	199
3932	Volce Navigator II	570

Video Monitors and Boards

Cutting Edge

Part #	Description	Price
3304	FPD Mac II	579
3302	FPD SE	579
3303	FPD SE/30	579
0193	FPD Classic	579

E-Machines

Part #	Description	Price
3919	T-16 8-bit Color System	2095
3920	T-16XL 24-bit Accel. Color	2885
3922	TX-16 8-bit Color Mac II	2730
2144	TX-16 8-bit Color SE/30	2730
0185	TX-16 24-bit Mac IIsi	3695
2414	TX-16 24-bit Color System	3695
3921	TX-16si 8-bit Color System	2730
0184	T-19 8-Bit Mac II	3950
0202	T-19 8-Bit Mac IIsi	3950
0204	T-19 8-Bit SE/30	3950
0205	T-19 24-Bit Mac II	5295
0207	QuickView Sound	282
0206	QuickView Studio	1795

Megagraphics

Part #	Description	Price
0153	16" Color 8-bit Mac II	2590
0154	16" Color 8-bit SE/30	2590
0155	16" Color 24-bit Mac II	4890
0157	19" Color 8-bit Mac II	4295
0160	19" Color 8-bit SE/30	4295
0027	19" Color 24-bit Mac II	6390
0158	19" Gray Scale Mac II	1875
0159	19" Gray System SE/30	1895
3924	Rival 19" Monochrm Mac II	1199
3926	Rival 19" Monochrm SE	1199
3925	Rival 19" Monochrm SE/30	1199
3378	Colorboard 208 8bit Mac II	379
2627	Colorboard 264 SE/30	678
0035	Raster Dps 24s	589
0064	Raster Dps 24si	799
0005	Raster Ops 24STV	1299
3704	Rasterops Clearview GS/30	1692
3662	Rasterops Clearview/GS II	1692

Sigma Designs
L-View Multi-Mode

Part #	Description	Price
0219	LC	1475
3854	Mac IIxx	1475
3853	SE/30 & IIsi	1475

Pageview

Part #	Description	Price
3855	Gray Scale IIci & IIsi	649
3858	Mac II	850
3856	SE	850
3857	SE/30	850
0001	Anti-Glare Filter	79
3859	Silverview Mac II	1850
3860	ColorMax24	4350
2566	Sony14" Color Monitor	825

Utilities

Part #	Description	Price
3764	1 Shot Worksheet	88
3823	911 Utilities	83
2785	After Dark 2.05	22
2873	AME Single User	158
2874	AME 1-5 Users	508
2875	AME 1-10 Users	848
3763	APB Express Tape	58
1244	Auto Save II 2.0	26
3328	Backmatic 2.0	49
0238	Calculator Const Set 2	44
3631	Calendar Creator	34
2895	Canopener 1.1	62
3927	Cheshire 1.0	61
3616	Clickchange 1.03	39
3765	Color Mac Cheese	56
0195	ColorDex Labeling Kit	35
0197	ColorDex Kit - 10 Pack	125
0196	ColorDex Kit - 5 Pack	85
3017	Complete Undelete	50
3515	Disk Doubler 3.0	44
3325	Disk Finder	24
1138	Disk Fit 2.0	57
2853	DiskExpress II	56
3727	Disklock 2.0	117
2984	Disktop 4.0	62
3406	Empower I Ver 4.0	88
3407	Empower II Ver 4.0	154
3826	Fast Back II 2.5	117
3286	Fileguard	138
3322	Fileguard - 5 Pack	348
3323	Fileguard - 10 Pack	578
3219	Flash	124
0258	FolderBolt	58
3209	Freedom Of Press 3.0	254
3839	Freedom Of Press Light	55
1940	Gofer 2.0	44
3561	Hand Off II	56
3766	INIT Manager	34
2191	INIT Picker 2.0	35
0282	InTouch	40
3680	Kiwi Finder Extender	64
3663	Mac Kern	58
3799	Mac Sleuth System Profiler	85
3481	Mac Tools Deluxe	78
0161	Maccess Card Reader	295
3533	MacInuse 3.0 Mac	58
2423	Macprint 1.2	93
1296	Macsafe II	106
3394	Marco Polo	151
3396	Marco Polo - 5 Pack	517
3395	Marco Polo - Twin Pack	251
3397	Mark Up	125
3399	Mark Up - 5 Pack	517
3398	Mark Up - Twin Pack	257
0148	Master Finder	49
2000	Master Juggler	56
3226	Menufonts 3.0	28
2189	Mockpackage Plus 4.4	31
2237	Multiclip 2.0	68
2148	Multidisk	48
1817	Night Watch	84
3279	Norton Utilities	83
3779	Now Utilities 2.0	74
1915	On Cue 1.3	34
3198	On Location 1.0.2	74
3556	Personality	48
3329	Power Icons	38
2067	Powerstation 2.5	33
2778	Prototyper 3.0	183
2194	Pyro! 4.0	24
3771	Quick Keys 2 Version 2.0	93
1670	Quickdex	33
2755	Quicklock 2.0	54
1946	Redux	48
2586	Retrospect 1.2	146
3805	Retrospect 1.2 w/Remote	264
3828	Remote 10pk	146
3327	Rival	48
0116	S.A.M. 3.0	64
3754	S.U.M. II	95
2005	Screen Gems	38
3522	Screen Locker	44
3554	Screen Shot	30
1356	Sentinel 2.0	85
2986	Shortcut	44
3778	Step Ahead 1.0	56
1600	Stepping Out 2.02	48
3458	Stuffit Deluxe 2.0	61
2002	Suitcase II 1.2	48
1021	SuperLaserSpool-5 Pack	298
1020	SuperLaserSpool 2.02	92
1122	Superspool 5.0	61
3762	Talking Moose	23
3804	Tempo II Plus	104
2077	Virex 3.1	56

Accessories

Basic Needs

Part #	Description	Price
0127	Utility Pac	15

Dust Covers

Part #	Description	Price
0102	IIsi 13" Mon Ext. KB	17
0104	LC 12" Mon w/LC KB	17
0044	Mac Classic w/LC KB	16
0100	Mac II/x/fx 13" Mon Ext. KB	17
0089	Mac IICX/CI 13" Mon Ext. KB	17
0058	Mac Plus w/Plus K8	16
0132	SE w/Ext. KB	16
0130	SE w/Standard KB	16
3754	SE/Plus Ext. Keyboard	17
3755	SE/Plus Std. Keyboard	17
0107	HP Deskjet/Deskwriter	11
0108	HP Laserprinter Series II/III	15
0103	Imagewriter II	11
0105	Imagewriter LO	15
0106	Laserwriter II SC/NT/NTX	17

Hardtop Covers

Part #	Description	Price
0110	Mac LC K8	15
0109	Mac Plus K8	15
0111	Mac Std. KB	15
0113	Mac Ext. K8	16
0123	Datadesk 101 KB	16
0124	Imagewriter II	15
3336	Casio Boss SF8000	195
3337	Casiolink For Mac	89
3275	Costar Label Writer	178
3618	Costar Organizer	195
3617	Costar Organizer Jr	68
1832	Fanny Mac OT Platinum	55
3991	Hot Keys	39
0061	HP DeskJet Cartridge	16
0231	Imagewriter Ribbon - Black	3
0235	Imagewriter Ribbon - Blue	6
0234	Imagewriter Ribbon - Brown	6

I/O Designs - MacLuggage

Part #	Description	Price
3905	Ultimate Classic Std KB - Black	54
3906	Ultimate Classic Std. KB - Blue	54
3797	Ultimate SE - Black	78
3791	Ultimate SE - Navy	78
3788	Ultimate SE Neon - Green	88
3790	Ultimate SE Neon - Pink	88
3789	Ultimate SE Neon - Yellow	88
3793	Classic/SE - Black	64
3907	Classic/SE - Blue	64
3795	II/IIfx - Black	98
3878	II/IIfx - Blue	98
3796	IIcx/ci/si - Black	84
3879	IIcx/ci/si - Blue	84
3794	SE Ext. KB - Black	74
3876	SE Ext. KB - Blue	74
3792	Imagewriter II Bag - Black	48
3875	Imagewriter II Bag - Blue	48

Kensington

Part #	Description	Price
3356	Filter 13" Apple RGB	63
2979	Security Kit System	32
2978	Dust Cover SE Ext. KB	9
3361	Dust Cover SE Std. KB	9
3362	Imagewriter II Dust Cover	9
3357	Laserwriter II Security Sys	32
3360	Mac II Mon. Cable Ext. Kit	32
3131	Mac II Ext, Cable Kit	29
3353	Macintosh II Mon. Stand	64
3354	Macintosh IIcx Mon. Stand	54
3338	Masterpiece Mac II	105
3676	Pass Proof (Cx,Ci,Left Drive)	70
3660	Pass Proof (SE Type Cases)	70
1442	Polarizing Filter (Platinum)	32
3339	Power Tree 10	19
3342	Power Tree 20	27
3343	Power Tree 50	54
3345	Power Backer 360	269
3346	Power Backer 450	337
3347	Power Backer 520	397
3348	Power Backer 800	746
3349	Power Backer 1200	946
3350	Printer Muffler 80	43
3292	SE Anti Glare/Rad. Filter	51
2975	Super Base	31
1314	System Saver Mac	63
2976	Tilt Swivel For SE or SE/30	21
3355	Universal Copy Stand	22
2977	Universal Printer Stand	15

Linebacker - MacPack Bags

Part #	Description	Price
2090	SE Ext K8 - Grey	69
1352	SE Ext. KB - Navy	69
2089	SE Ext. KB - Wine	69
0499	SE Reg. KB - Grey	55
0498	SE Reg. K8 - Navy	55
0493	SE Reg. K8 - Wine	55
0494	Imagewriter Bag - Navy	45
0491	Imagwriter Bag - Wine	45
3473	MacRecorder Voice Digitizer	88
2584	MacRecorder Sound Sys 2.02	158
3840	Mac Tilt Classic	67
1274	Mac Tilt Platinum Plus	67
1273	Mac Tilt SE	67
0201	MacSpeaker	169
1277	Mouse Cleaner 360	3
1306	Mouse Pad - Black	6
1305	Mouse Pad - Blue	6
1307	Mouse Pad - Gray	6
1308	Mouse Pad - Red	6
3324	MyDisk Labeler III	41

Smack-A-Mac-Covers

Part #	Description	Price
3756	13" Mon & Ext Keyboard	18
3757	Smack A Mac - Stuffed Mac	8

Targus - Premium Bags

Part #	Description	Price
3476	Bag Cx/Ci Black	74
2545	Bag Mac/SE Ext KB - Black	68
2630	Bag Mac/SE Ext K8 - Grey	68
2629	Bag Mac/SE Ext KB - Wine	68
2546	Bag Mac/SE Std KB - Black	54
2628	Imagewriter Bag Black	45
3195	Imagewriter Bag Blue	45
1117	Teakwood File (45 Disks)	14
1118	Teakwood File (90 Disks)	21
2475	Teakwood File (135 Disks)	30
2732	Toner Cartridge II NTX	104
2733	Toner Cartridge Plus	89
1503	Tool Kit Mac	8
2464	UPS 110SE	208
0305	UPS 370ci	328

Storage Media

Sony

Part #	Description	Price
0938	Bulk 50 Pack DS/DD 800K	39
2193	Bulk 50 Pk DS/HD 1.44MB	75
1158	800K DS/DD Disks -10 Pk	12
2192	1.44MB DS/HD - 10 Pk	19
3109	Tape Cartridge 150MB	21
2469	Tape Cartridge 60 MB	19
0932	Tape Cartridge 40M8	19
2657	Fuji 10 Pk DS/DD 800K	7
3096	Fuji 10 Pk Rainbow 1.44M8	21
3090	Fuji 10 Pk Rainbow 800K	7

Kensington PassProof

PassProof offers total defense against unauthorized use of your Mac without inhibiting authorized use. It's safe and easy to use and unlike potentially dangerous encryption programs, your data is never altered or manipulated at any time. PassProof works with a simple and logical series of "Locks". Some are hardware, some are software – you decide which ones to use and when.

Kensington — List $100

#3660 PassProof SE Type Cases $70
#3676 PassProof Cx, Ci, Left Drive ... $70

Maccessories Tilt/Swivel

Raises your Mac 2". Allows you to swivel up to 100° (50° each way from center) and tilt up to 16°. Made of sturdy plastic and high density polyethylene for smooth movement.

Kensington — List $50

#2976 Tilt/Swivel $21

Maccessories SE Anti-Glare Filter

Put an end to eye strain, blurred vision, and headaches with our Maccessories Anti-Glare Filter. Made with a unique anti-glare, reflective coating, these filters reduce glare reflected from your Mac's screen up to 96%. And they improve screen contrast and clarity up to 20% to eliminate the "fuzzy halo" that often appears around text and graphics. So even the tiniest numbers on a spreadsheet will be easier to read. Made of optical quality glass with ceramic anti-reflection, scratch-resistant coating. Filters VLF/ELF radiation and dissipates statics. Grounding wire draws emissions to earth grounding point. Slips onto front of monitor, No adhesives required.

Kensington — List $100

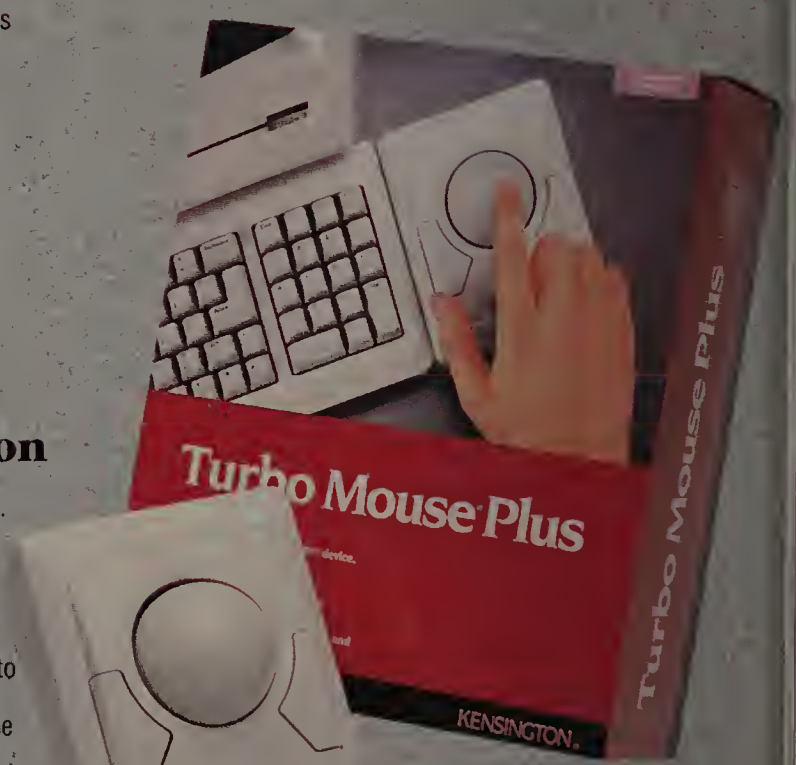
#3292 SE Anti-Glare Filter $51

Kensington PowerTree

PowerTree protects your Mac against electrical power problems. Each provides a lighted master switch and size outlets protected against surges, dips, EMI and RFI line noise, plus an LED to indicate if the system is secure. If the circuitry fails, a buzzer sounds and the LED goes dark.

Kensington — List: $50, $30, and $100

#3339 PowerTree 10 ..... $19
#3342 PowerTree 20 ..... $27
#3343 PowerTree 50 ..... $54



Kensington Turbo Mouse

If you use a mouse, chances are you've come to swear by it. But here's a reason to give it up: Turbo Mouse. Winner of the 1987, '88, and '89 *Macworld* World Class Awards for Best Input Device, Turbo Mouse is quicker, more precise and easier to use than any other mouse. Because the ball is on top, you move only the ball, not the whole mouse. Its automatic acceleration senses the speed at which you're working and moves the cursor further when you move faster. Roll the ball slowly for 200 DPI pin-point precision. Roll it quickly and you'll fly across even the biggest screen.

Kensington — List $169

#1411 Turbo Mouse ADB $107
#1292 Turbo Mouse Plus $107

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ONE Word for EtherNet and LocalTalk: PhoneNET

PhoneNET StarController® EN Series 500

The StarController EN repeats Ethernet signals over 12 ports and monitors network traffic and error rates. It's fully compliant with the IEEE 10BaseT standard, so it supports a variety of Ethernet devices, from PCs to VAX mini-computers. It continuously checks the connection to each device, automatically shutting off unused ports to prevent disruptive signal error. StarCommand 2.0 management software, included with the PhoneNET Star Controller EN, continuously monitors your network as a background application running under MultiFinder. List: $2,495

#3333 PhoneNET Series 500.....$1,588

PhoneNET StarController Series 300

The StarController hub is a multiport LocalTalk repeater you mount in the telepho wiring closet. It connects all your network devices together in a star configuration, repeating and amplifying signals over existing telephone wire. Extend your netwo as many as 48 locations. Easy-to-read LED displays on the StarController give yo summary of traffic on each of the 12 ports and alert you to signal errors. Manage your LocalTalk and Ethernet StarController hubs from the same Macintosh.
Farallon Computing List: $1,295

#0829 PhoneNET Series 300.....$824

New! Now supports color

Timbuktu 4.0

This new version of the Eddy Award-winning software now supports color. It also provides clipboard exchange and full background file transfer. Timbuktu is a versatile network application that allows you to observe or control another Macintosh over any AppleTalk network. With Timbuktu, multiple users can share multiple screens across the network—turning any software application into a team activity!
Farallon Computing

#0420 Timbuktu 4.0 .....$139
#0422 Timbuktu 4.0 10-Pack $719
#0423 Timbuktu 4.0 30-Pack $1,429

Ethernet Cards for SE/30 and Mac IIs

The 10BASE-T compliant PhoneNET Card enables Macintosh SE/30 or Macintosh II family users to use the increased speed and bandwidth of Ethernet running over ordinary telephone wire. A built-in, 10BASE-T transceiver lets you attach twisted-pair telephone cable directly to your Macintosh—no external connector or transceiver is needed. The PhoneNETCard comes with Timbuktu software .Farallon Computing

#3902 Mac II $358
#3904 Mac II 10-Pack $3,258
#3901 SE/30 .....$358

Circle 70 on reader service card

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Thousands of our satisfied and loyal customers have made us the world's third largest direct market reseller of Macintosh products. We would like to introduce you to some of our team members who make it all happen. From great service, low prices, overnight delivery and most of all our knowledgeable sales advisors – it's truly the people at the MacZone who are working extra hard for YOU... our customer.

Ann Gilbert

Customer Service

"Although there are many kinds of Macintosh companies in the market place today, the MacZone is the company that puts customers first, providing them with the best service. The way we do business everyday is based on our belief that selling you products is not enough. We want you to be a satisfied MacZone customer. We are determined to do our best and provide the special service necessary to ensure total customer satisfaction." – *Ann Gilbert, Customer Serivce Supervisor*

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Our staff of over 25 people are the finest in the industry. They know their products and know how to assist you by suggesting the products that best suits your needs. Our MacAdvisors are highly trained by developers of Mac products and use these products themselves. Thousands of new products are introduced into the market every year, and we make sure you only get the best of them. Call one of our advisors today for the best service you can get."
– David Burcham, Sales Manager

Dave Burcham

Technical Support

"The Apple Macintosh is an amazing computer. No matter what Mac you have, we can help you enhance it. The technical support staff at the MacZone is dedicated to providing you with the best possible information and service. Many of us have had the opportunity to work with Apple's upcoming System 7.0 and its new disk and file sharing capabilities. I believe the many great new features of System 7.0 will require a lot of customers to upgrade their processors and memory. We are ready to help you make an intelligent and knowledgeable decision."
– Dan Stinson, Technical Support Manager

Dan Stinson

Corporate Sales

"Here at the MacZone, we understand the frustrations the corporate, government and institutional buyer faces. Our Corporate Department will do everything in its power to make your purchasing hassle-free. The reason is simple. Our corporate account executives have vast experience in dealing with requests for quotes, purchase orders and institutional processes. We strive to work within YOUR organization's purchasing system to make YOUR job easier.The MacZone also has a special toll-free corporate line (800-258-0882) to speed up your order placing even more! The reason AT & T, General Electric, NASA, Harvard and hundreds of other organizations come to the MacZone is because we offer guaranteed product availability and low prices. Give us a call, you'll be glad you did."
– Joe Rand, Corporate Account Executive

Joe Rand

Roger Rudolph

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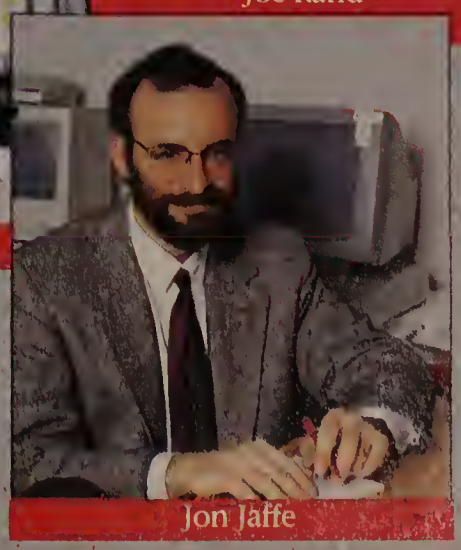
"Shipping thousands of orders requires precision handling. We understand the need to ship the correct product the first time because your satisfaction is important to us. Your order is packaged carefully in environmentally safe packaging material and shipped overnight via Airborne Express with the greatest care. Our goal is to ship the right product the first time, every time. Our state of the art computer package tracking system allows us to guarantee next business day delivery." – Roger Rudolph, Warehouse Manager


Jon Jaffe

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"I derive tremendous satisfaction when I know that our buyers have negotiated low prices for our customers. My job is to ensure availability of the latest products at prices below our competition so that we can pass significant savings on to you." – Jon Jaffe, Purchasing Manager

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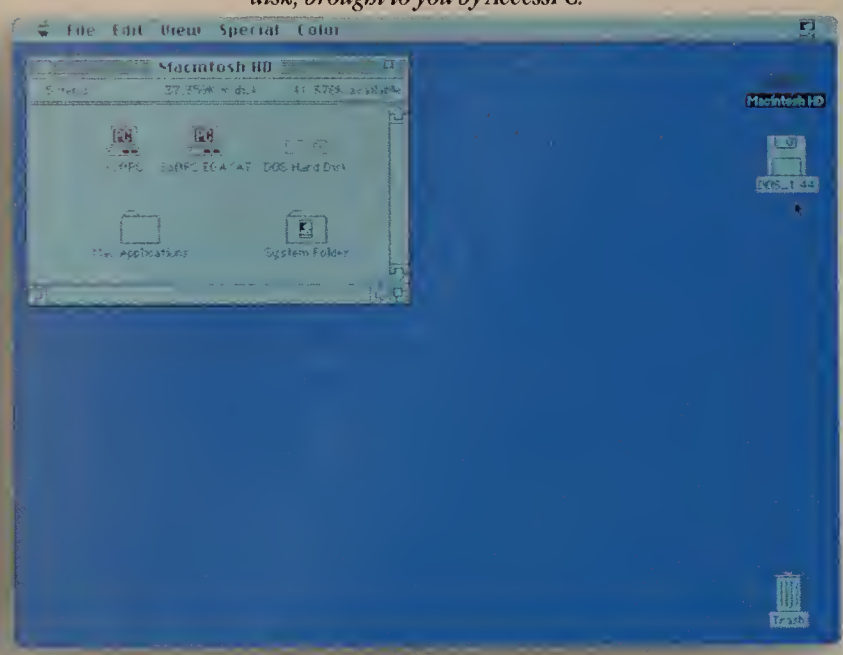

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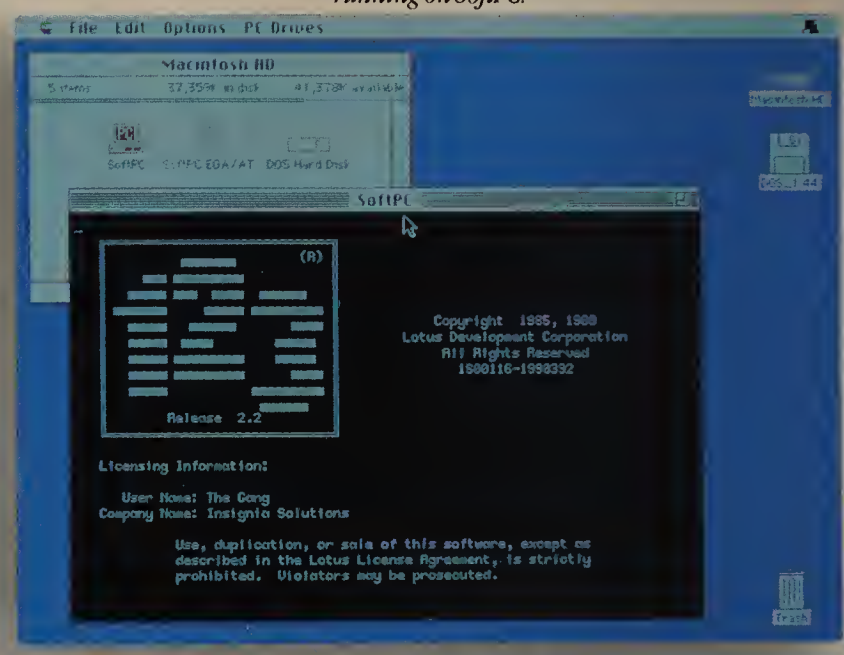

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Circle 72 on reader service card

Exploring the Mac

INFORMATION SOURCES THAT MAKE IT EASIER

BY DEBORAH BRANSCUM

There's a dazzling array of information out there that can add to one's knowledge about the Macintosh. Here's a brief and opinionated overview of resources that *Macworld* editors have found useful or entertaining.

Newsletters The *FileMaker Report* has been in my good graces recently because it solved a thorny problem: how to sort on repeating fields in a record without sorting on the first entry. Late one afternoon I called Claris tech support begging for an answer to the mystery. The kindly technician who took my call was unable to help but said that according to rumor, the *FileMaker Report* folks had an answer. Rumor was right and a forthcoming issue should spell out the solution.

The *FileMaker Report* regularly showcases tips and tutorials for this popular database. A 5-issue subscription costs $36 in the United States; 20 issues go for $116. Contact Elk Horn Publishing in Freedom, California, by phone (408/761-5466) or fax (408/761-5468) for more details.

The Cobb Group of Louisville, Kentucky, publishes four monthly newsletters that provide application tips and techniques using clear and straightforward language and graphics for Macintosh users. The April issue of *Excellence,* which focuses on Excel, included an explanation of the problem of stray digits in the results of Excel formulas—and how to solve it. In April, *Inside Microsoft Works* tackled drawing tips and a spreadsheet technique, and *Inside Word* included how-to's on overlapping text and graphics and dealing with hidden text (as well as a detailed bug report). The March premier issue of *Inside HyperCard* followed the formula with tips on managing radio buttons, debugging, and using the Navigator palette.

PETER ALSBERG

Subscriptions for the Excel, Word, Works, and HyperCard newsletters cost $59, $49, $39, and $69, respectively. Free sample issues are available from Cobb's customer service department at 800/223-8720. (Cobb can also be reached at 502/491-1900.)

Software A couple of interesting stacks make browsing worthwhile. A clean design distinguishes Macintosh Yellow Pages, a HyperCard directory to Macintosh hardware, software, and accessories. This guide does not cover everything, but it does cover more than 1500 products. Product descriptions include suggested retail prices, memory requirements, and 800 numbers when available. A one-year, six-issue subscription is available for $69 through product manager Laura Marmorstein in Cambridge, Massachusetts. Reach her by phone at 617/577-9568.

Bomb and Crash Encyclopedia by Erik Thauvin offers brief, clear descriptions of the most common Macintosh errors and suggested solutions. Thauvin, a computer consultant, based his $15 shareware stack in part on the expertise of the BMUG tech-support folks. You can download the Encyclopedia from the HyperCard Forum (keyword MHC) on America Online or receive it directly from Thauvin by

(continues)

IT ALL STARTED INNOCENTLY ENOUGH.

Then the conflicts began.
At first we did it just for fun. A screen saver. A menu clock. But you know how it goes: you keep wanting more. A font/DA manager, then an anti-virus utility and a spell checker...soon we had a system folder full of INITs. All rushing into RAM at every startup.

Clearly, it had to stop.
First some of the INITs stopped working. Then one of our major applications just refused to run. Before long the little devils were regularly causing system crashes with reckless abandon.

So then we found INITPicker. It clearly identifies all our INITs and lets us select which ones to run *in what order.* It can even figure out which INIT has caused a crash and prevent it from loading. So we don't have to spend hours trying to find the culprit by the process of elimination.

INITPicker. It's just a real simple program that keeps INITs real simple. Needless to say, *our* conflicts are over.

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"My top recommendation..."
—MacUser, August 1989

"Simply outperforms and outclasses its competitors."
—MacWEEK, June 12, 1990

Circle 228 on reader service card

SERVICE HERO

In the spring of 1990, Brad Saunders of Rochester, New York, bought an Ehman 44MB removable drive that used a SyQuest mechanism. He had problems with strange system crashes, data corruption on some files, and occasionally, being unable to start the system. Eventually the internal hard drive in his system wouldn't mount. Saunders learned this year that SyQuest reportedly had problems with some F5E series SQ555 drives, the model he owns. Ehman referred him to SyQuest, which asked him to send the drive in for an evaluation.

A call came from engineer Pat Allen two days later. SyQuest wanted to replace Saunders's SQ555 mechanism. SCSI-related problems were brought about by the lack of shielding and filtering in the power supply, so Allen shielded it and added the proper filters as well at no charge, writes Saunders. "My 44MB Ehman now acts like a different drive. It spins up in half the time and no longer freezes my Mac."

SyQuest officials say few consumers have been affected by this problem, but the company is willing to deal with faulty products. The freeware utility SCSI Probe, generally available online or through user groups, can determine if your drive is version F5E. If you are having problems with a SyQuest-based removable drive, such as a high error rate or a loud noise during retries, contact SyQuest's tech support at 408/226-4280.

sending a disk to MacSpect Inc., 2269 Chestnut St., #338, San Francisco, CA 94123-2600.

Books There are many books, recent and more established, that we

(continues)

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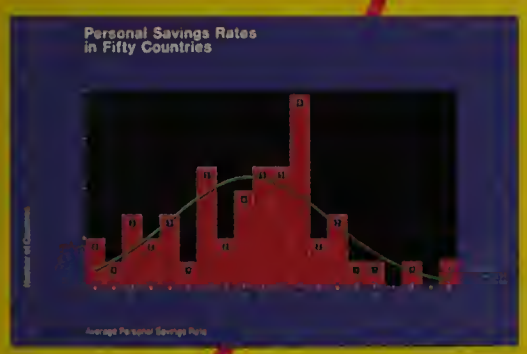
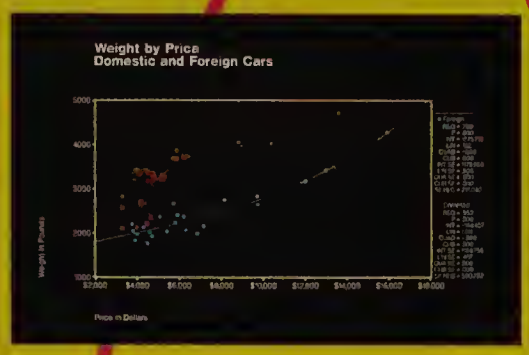
As long as you love us, it's all right. And love us you will. Statistical software from SPSS is designed to work the way you work. By giving you the power to enter, edit, manage, analyze and present data on virtually every type of PC, workstation, minicomputer and mainframe. By giving you better decision-making ability through the most comprehensive set of statistical procedures available. And by giving you a choice of options to meet your specific data analysis needs. So if you're thinking about statistical software, think about flexibility. Because flexibility means value. And when it comes to value, we top the charts.

The Accessibility of SPSS makes it ideal for beginners and advanced users alike. With its straightforward menus and context-sensitive help and statistical glossary, SPSS gets you started fast. And with the help of our time-saving programming facilities, including macros and a matrix language, you'll have the power to go deeper even faster. And regardless of your experience with statistics, you'll be supported by the documentation and training that's set the industry standard for over 25 years. Documentation that INFOWORLD calls "The Best in the Business."





The Statistical Procedures in SPSS give you the power to examine data more thoroughly, revealing patterns that might otherwise go unnoticed. We offer the most in-depth group of statistical procedures available, including univariate and multivariate descriptives, model building, hypothesis testing, clustering and classification, survival analysis, time series and perceptual mapping. No matter what your question, SPSS provides the flexibility to find the answer.

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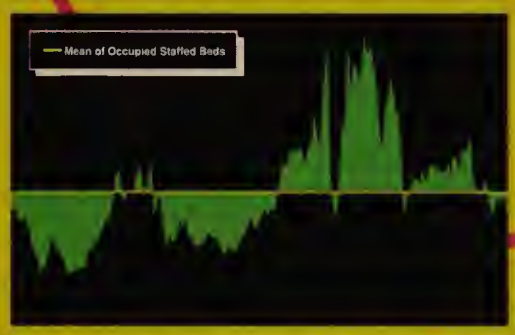

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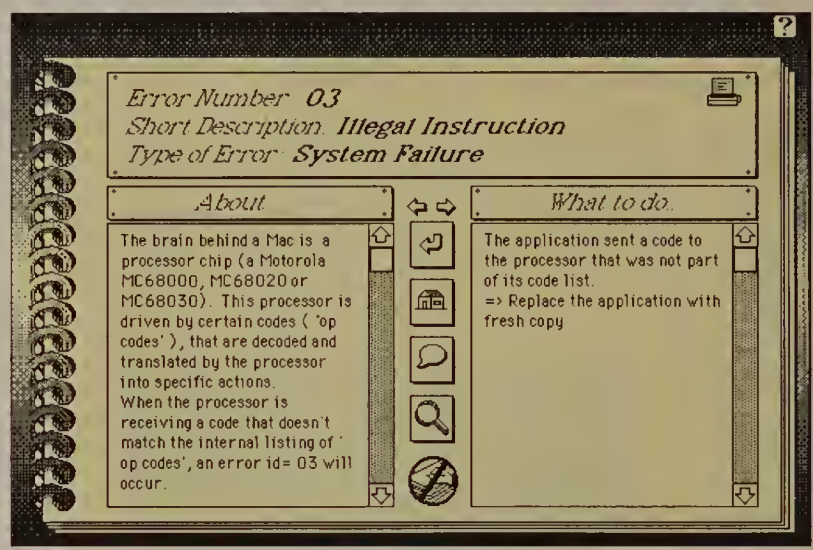


The Bomb and Crash Encyclopedia is a $15 shareware stack with definitions of system failures, application failures, and failures of disks, serial ports, and clocks. My favorite advice, for one system failure: "Restart and pray."

often turn to in the office. Veteran publications include *Technical Introduction to the Macintosh Family* (Addison-Wesley, 1988) and *The Macintosh Bible* (Goldstein & Blair), which is regularly updated. The $19.95 *Technical Introduction* paperback was recommended by one editor with these words: "Although it doesn't cover the latest hardware and software developments, the book clearly explains the concepts behind the Macintosh user interface and ties the concepts to the ROM toolbox."

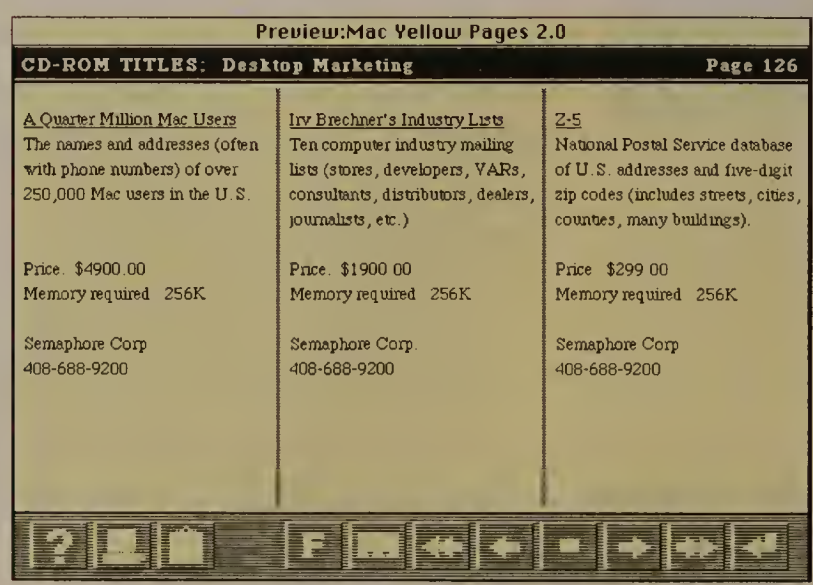
The Macintosh Bible is the granddaddy of tips-and-tricks books, now in its third edition. I find its 1100-plus pages a little intimidating, but clearly others don't—the publisher claims it's the best-selling Mac book of all time. This $28 tome includes several updates and a 30-day money-back guarantee.

More recently published is *The Big Book of Amazing Mac Facts* (Microsoft Press, 1991) by *Quick Tips* author and *Macworld* contributing editor Lon Poole. Poole's $24.95 handbook is also a broad compilation of useful tips and techniques in an attractive, accessible layout that taught me a lot. Both books make for superb browsing.

Fans of Jim Heid's *Getting Started* column in this magazine should enjoy the *Macworld Complete Mac Handbook* (IDG Books Worldwide, 1991). This $26.95 volume, from a subsidiary of *Macworld*'s parent company, covers a broad range of topics, from how to buy a Mac to animation, System 7.0, and more.

The Macintosh Bible "What Do I Do Now?" Book (Goldstein & Blair, 1990) by Charles Rubin is a $12 troubleshooting guide to common errors and resolutions. It's clear and simple and should help you avoid needless calls to tech support.

Typesetters often wince at the ugly publications churned out by Mac enthusiasts with more energy than style. *The Mac Is Not a Typewriter* (Peachpit Press, 1990) is a wonderful, short stylebook by Robin Williams. *(continues)*



The Macintosh Yellow Pages is a mixed bag. It's fun to browse, but the information is sometimes incomplete. Version 2.0 lists only eight Mac books, for example, and information in two of the CD ROM listings here is outdated. More popular categories are more complete.

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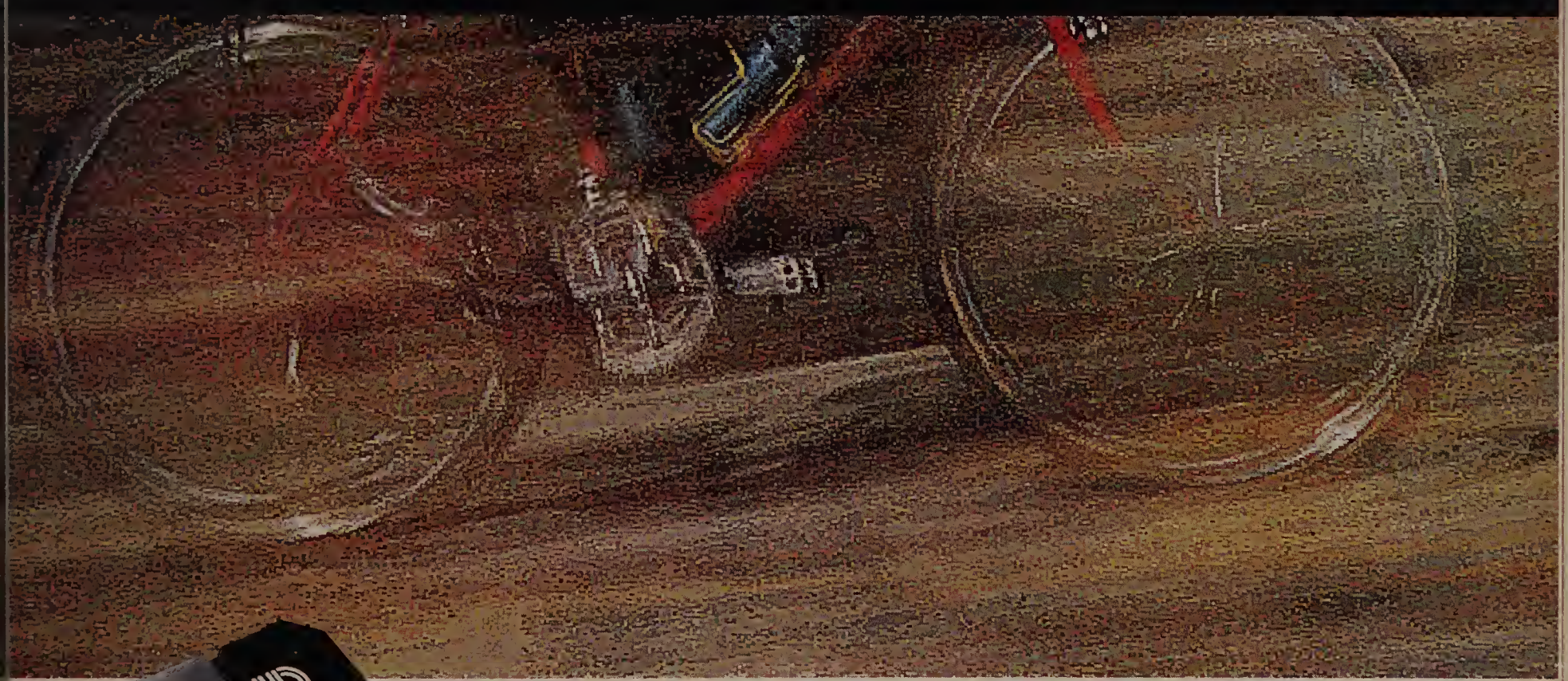

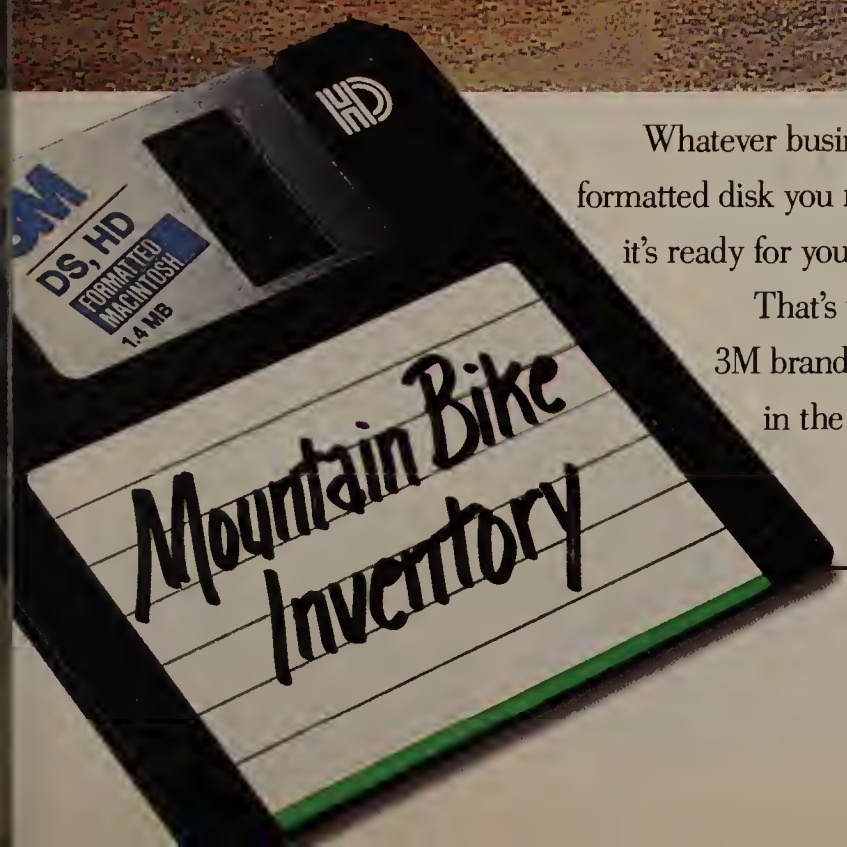

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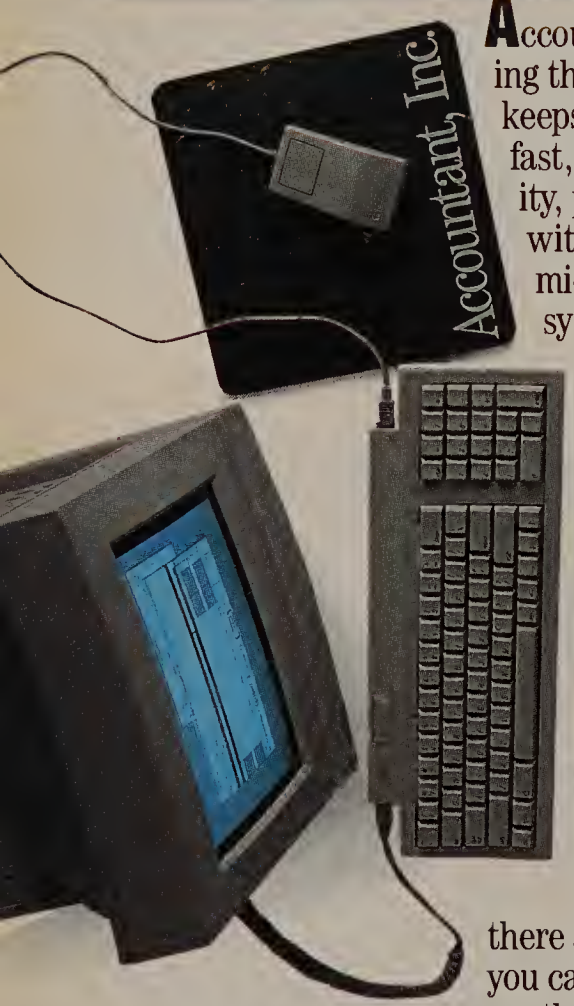

Accountant, Inc. 2.0 is changing the way small business keeps its books. Intuitive and fast, it provides more flexibility, power and reporting — with less work. It is the premier integrated accounting system for the Mac, leading a new generation of financial management software.

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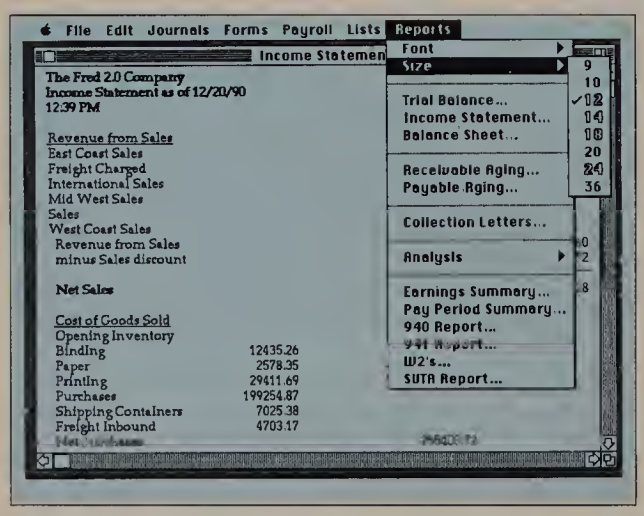


Use any font and size to customize your reports.

Instant Reports.

Up-to-date information is also critical in a small business. When your resources are tight, you want to make the most of them. And you can if you are able to interpret the information in your accounting system. With Accountant, Inc. you have more than just accounting data — you've got sales, marketing, inventory, payroll, and other analysis in all shapes and forms.

We've added to Accountant, Inc.'s already extensive reporting formats — now over 100 in all — to tell you anything you need to know. And you can select any font and size to make reports look great too.

Accountant, Inc. has the uncanny ability to take everything you've given it during the day and interpret what's really going on. Account agings and transaction listings, income statements, balance sheets, payroll reports and sales breakdowns any way you like, inventory levels, back orders and more. Sharpen the focus with Accountant, Inc.'s advanced analysis tools to see who's ordering what, who owes money, when a certain customer placed his last order and how he's doing on his credit line.

Every Evolution Needs a Leader.

Accountant, Inc. can handle any type of business: manufacturing, retail, professional and service companies. It's been designed with maximum flexibility, so you can configure the program to fit your business.

The new Accountant, Inc. 2.0 has even more of the same great features. We don't run you around with separate modules. Everything's designed to work together, so you'll see your information flow smoothly throughout your organization, the way it was meant to.

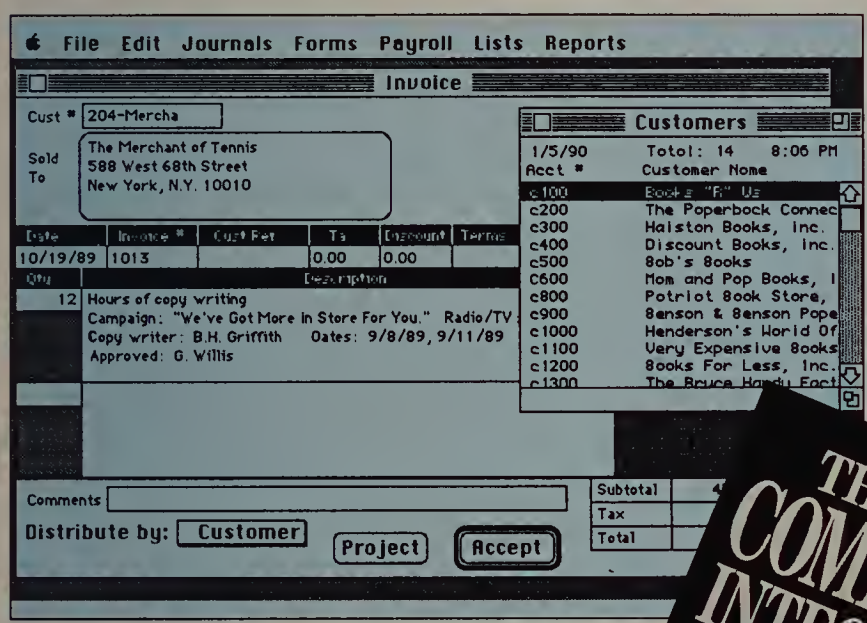
Easier Than Ever.

Because you don't have a lot of time, Accountant, Inc. handles all of your company's time-consuming financial details. Everything from writing checks, invoices and credit memos to creating insightful reports, meticulous breakdowns and extensive analysis. It makes your life easier too — from automatically tracking back orders to reconciling the checkbooks. Pay bills by clicking on them, create invoices by filling in a form. And the program takes care of all

siness Accounting.

the tedious posting and balancing automatically.

Accountant, Inc.'s built-in power gives you the flexibility to turn on a dime, like the rest of your business does.



Service company invoices are formatted to allow plenty of written description for each item.

THE ONLY COMPLETE INTEGRATED SYSTEM

You'll find Accountant, Inc. is easy to set up. With excellent tutorials and many sample companies, it's a breeze to learn. Accountant, Inc. is backed by a national network of independent, qualified installers who can install and train on site.

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Your accounting system is an important investment. It's important to invest in a system that will grow with you.

Accountant, Inc. is designed for growth. If your business grows faster than you expect, you'll be able to upgrade to a multi-user version of Accountant, Inc. (available this summer). That means as many people as you want can use Accountant, Inc. at the same time.

Like Apple, we believe in providing our customers with a clear upgrade path when we offer new technology. With the multi-user version, you'll be able to trade up easily, without any changes to your files and without any new training. And we'll even give you a generous rebate on the version you buy today.

System 7® Savvy.

Apple's long-awaited System 7 software is here, and in the future Accountant, Inc. will be one of the first programs that takes System 7 capabilities to their outer limits.

For example, our System 7 compatible version will link Accountant, Inc. with forms design software, enabling you to create fully customizable forms. You can make your invoices, purchase orders, statements and other forms look exactly how you want them to.

How'd you like to have your reports automatically create 3-D charts? With System 7's publish and subscribe feature, Accountant, Inc. and a graph program will take your plain old text reports and bring them to life, instantly.

Today, Accountant, Inc. version 2.0 is the most exciting accounting and financial management software available for the Macintosh. And tomorrow, with multi-user and System 7 capabilities, Accountant, Inc. will continue to evolve as the leading edge in Macintosh accounting.

Minimum Hardware Requirements: *Apple Macintosh with 1 megabyte of memory (2 megabytes recommended) and hard disk drive. Works with Plus, SE, SE/30, II, IIx, IIcx, IIci, IIFX, Portable, Classic, si, LC, ImageWriter, LaserWriter, StyleWriter, Appleshare and Multifinder.*

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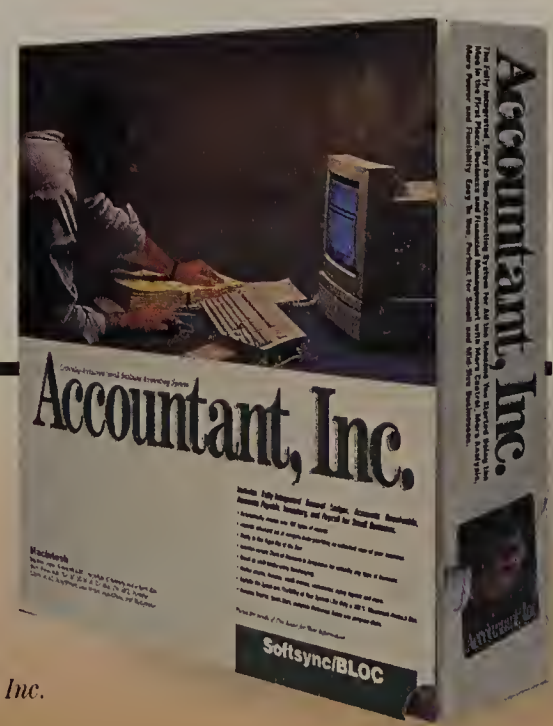

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If you would like to learn more about this system, call us toll-free at **1-800-933-2537**... or see your local software dealer.

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This $9.95 volume shows the typesetting-impaired how to get professional results from the Mac.

Although you might not know it from Apple's latest introductions, there are still dot matrix printers out in the world. *Macintosh Printer Secrets* (Hayden, 1990) by Larry Pina is a $34.95 guide to setup, repair, and upgrade for such printers.

The following three volumes aren't Mac-specific but make for interesting reads. *Cyberpunk* (Simon & Schuster, 1991), $22.95, by Katie Hafner and John Markoff, reveals the compelling stories behind several young hackers who clashed with the law, including Robert Morris, Jr., the Cornell student whose virus brought down the Internet network.

Rogue Programs: Viruses, Worms, and Trojan Horses (VNR Computer Library, 1990) and *Computers Under Attack: Intruders, Worms, and Viruses* (ACM Press, 1990) are collections of academic and professional articles covering the mechanics, law, and ethics of computer programs gone wrong. *Rogue Programs,* edited by Lance J. Hoffman, is priced at $32.95; *Computers Under Attack,* edited by Peter J. Denning, is $18.95.

Bookstores If you can't find the computer books you want locally, consider buying by mail through one of the following bookshops. Computer Literacy, in San Jose, California, can be reached at 408/435-1118. Opamp Technical Books in Los Angeles is at 213/464-4322. Powell Technical Bookstore in Portland, Oregon, is available at 503/228-3906 or 800/225-6911. And Quantum Books, in Cambridge, Massachusetts, can be reached at 617/494-5042.

For more Mac resources, see the *Conspicuous Consumer* column from June 1990. M

(Research assistance by Carolyn Bickford.)

. . . . . .

Send nominees for sainthood to Service Heroes, Macworld, *501 Second St., San Francisco, CA 94107 or via AppleLink (Macworld1) or America Online (Branscum). Conversely, drop* Conspicuous Consumer *a line if a company is ignoring you.*

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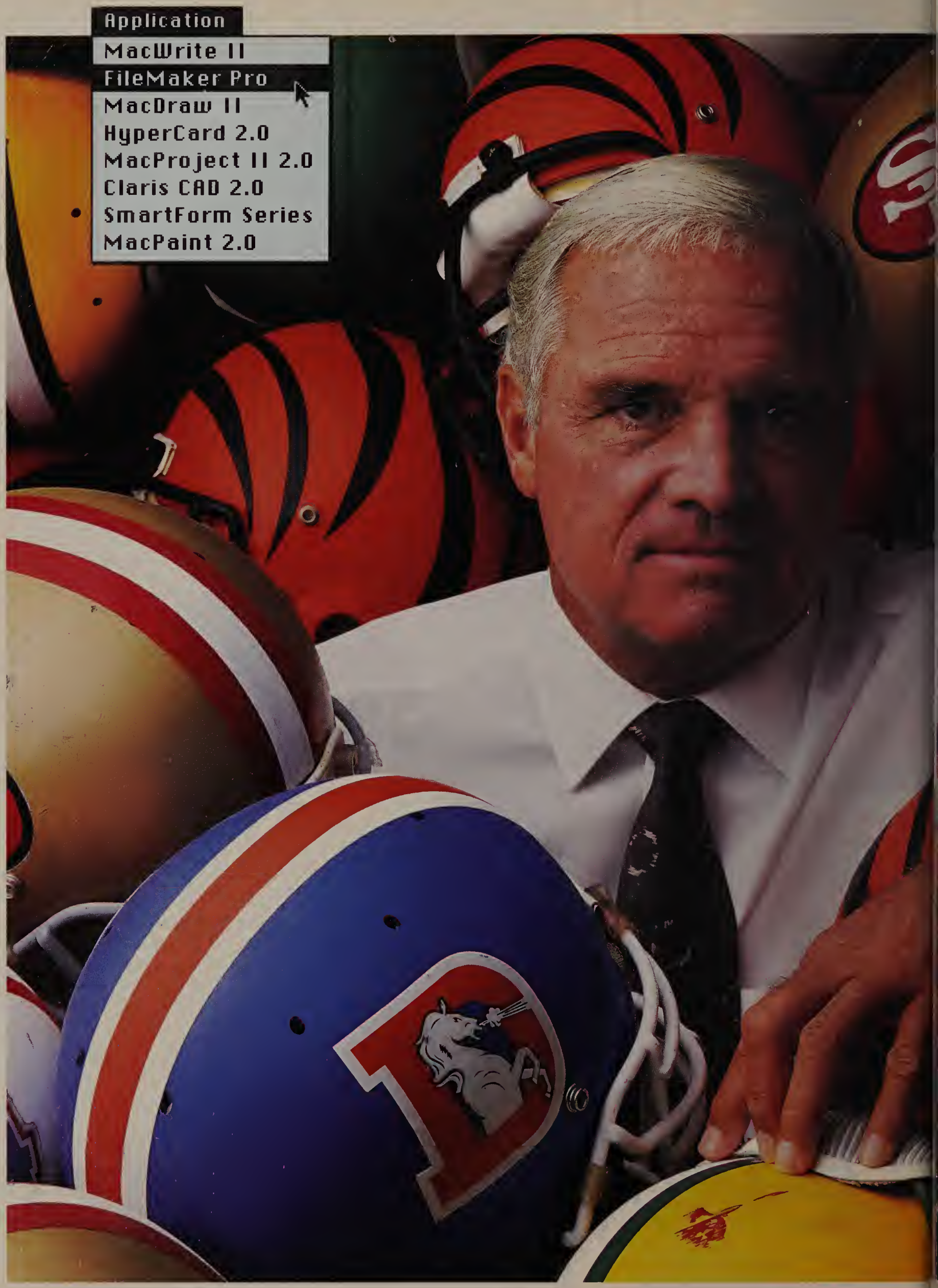
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Story

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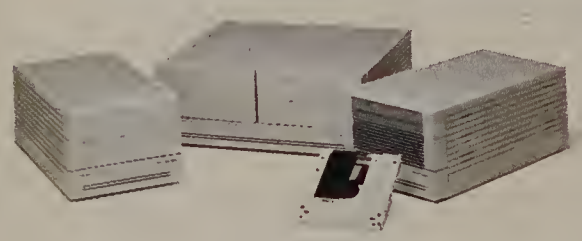

Our new slimline ZFP (zero footprint) models, for instance, reflect giant steps of their own – and leave no footprints. Tucked smartly under the Mac Classic,™ or just as smartly between the Mac si™ chassis and monitor, they're available in 50, 100, and 205 MB capacities. And they're among the fastest in the industry. What's more, they include comprehensive disk management software, with advanced features like disk mirroring and volume spanning.

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For literature circle 127 on reader service card

MACWORLD NEWS

by Dan Littman and Tom Moran

It's a Color Calibrator *and* a Floor Wax

RasterOps announced in mid-May its CorrectColor Calibrator, a device that calibrates 24-bit displays, printers, and scanners and measures colors on paper and film. Intended for publishing professionals, the RasterOps calibrator uses four optical sensing devices in a suction cup that attaches to a monitor. Three of the optical sensors measure RGB, and the fourth measures white light. The sensing device, together with its base unit (called the Color Integration Processor) and various standard attachments, acts as a densitometer for measuring colors on film, as a colorimeter for calibrating a monitor and measuring colors on paper, and as a luminance-measuring device that can accurately set the color temperature of certain monitors.

To set the base color temperature of a monitor, the calibrator needs to know the size and precise refresh rate of the monitor so that it can synchronize with the monitor's scanning beam. Currently the CorrectColor Calibrator looks for identification in the monitor's ROM and then looks up the monitor's refresh rate in a table kept in the calibrator. However, for marketing reasons, RasterOps includes the necessary information only for Apple's 13-inch color monitor, some Sun monitors, and all RasterOps 24-bit displays, the company said. To set the color temperature, the user places the sensing device over a white rectangle on screen, and the software makes a contour map of the screen and changes the monitor's gamma tables. A total of 49 rectangles appear in a 7 by 7 grid, so 49 measurements are necessary. However, this process usually needs to be done only once per monitor.

JOHN WILLIAM LUND

The RasterOps CorrectColor Calibrator calibrates 24-bit monitors, printers, and scanners. Its four optical sensors can also measure color on paper or on transparencies.

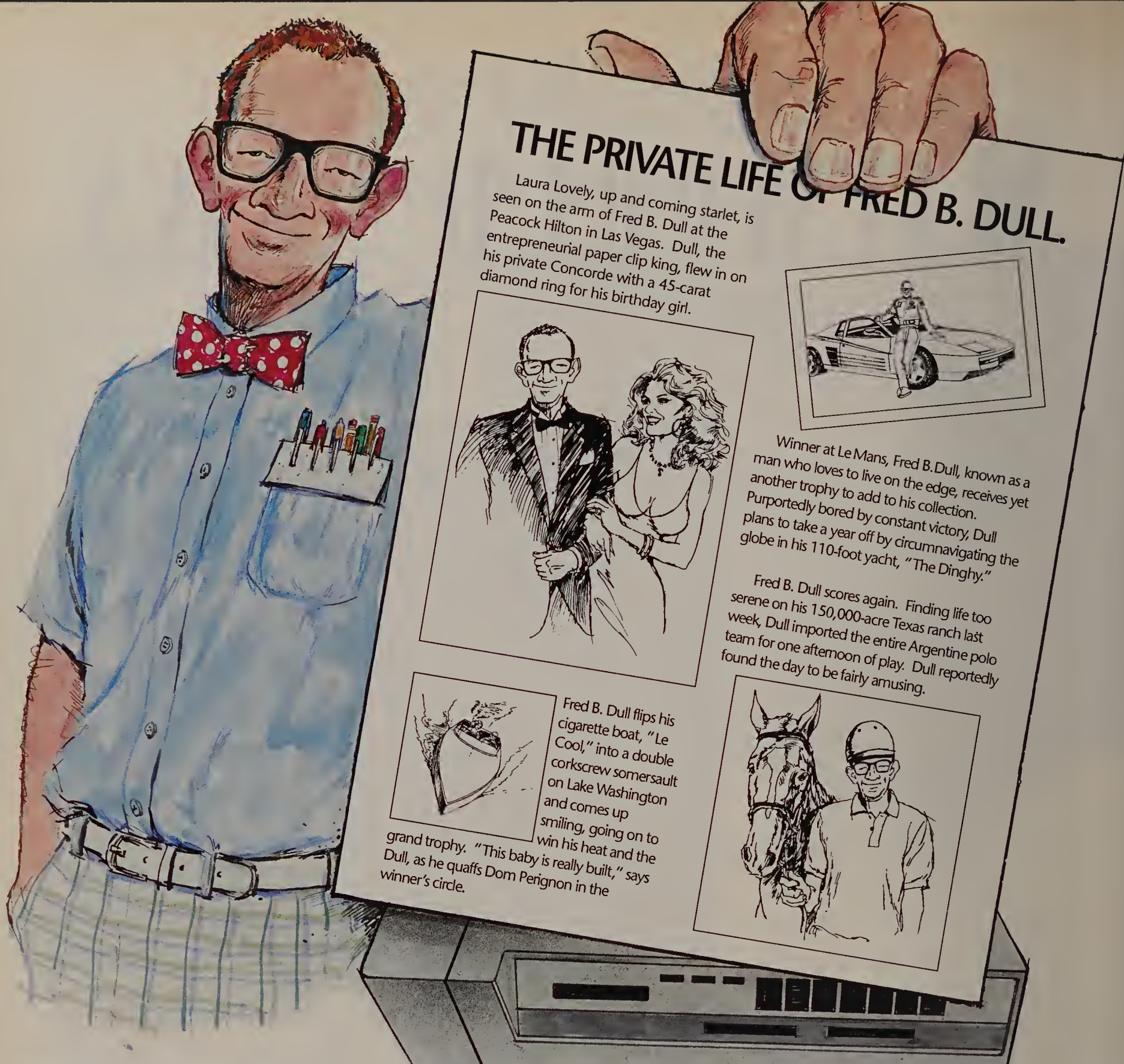
To calibrate a scanner, the user places a reference image in the scanner and the calibrator software puts it on screen next to a disk-stored copy of the same image. Differences between the two images tell the calibrator how to calibrate the scanner. Special attachments that come with the sensing device let you use a similar process to calibrate a printer or film recorder. RasterOps said the calibrator will support any standard color space.

RasterOps began shipping the CorrectColor Calibrator to developers of publishing software at the end of April, and expected volume shipments to end-users to begin in May. RasterOps expects developers to make changes to their applications to help them work with the calibrator. The list price for the CorrectColor Calibrator was not set at press time, but RasterOps predicted it would be around $3000. The company will provide an ADB version for the Macintosh, and a serial-port version for PCs. For more information, contact RasterOps in Santa Clara, California, at 408/562-4000.—**T.M.**

Soft TV

Playing full-motion video on a Macintosh screen has until now required special hardware to convert input from a tape, laser disc, or video camera.

(continues)



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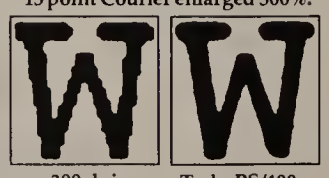
Resolution close up, 13 point Courier enlarged 500%.



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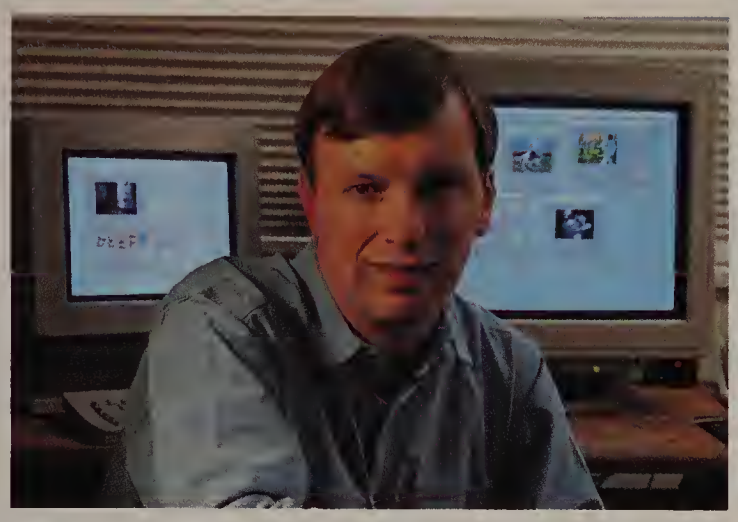
End users circle 244 on reader service card
Dealers circle 246 on reader service

Cricket Software veteran Jim Rafferty is developing software-only tools to pull compressed video from a hard drive, decompress it, synchronize digitized sound, and play it in real time.

Unfortunately, Rafferty says, a standard Macintosh IIci tops out at drawing a 200-by-150-pixel video window at 15 frames per second. That's no substitute for a VCR, but it is good enough to preview a movie, study an animated detail from an on-disk tutorial, or edit a video.



MICHAEL SEXTON

Digital video is coming to the Mac: Jim Rafferty with several videos cued up on his Mac and ready to roll.

Rafferty's software is in three modules code-named Hollywood (for transferring video from a video source to a hard drive—this requires a frame grabber), ClipEditor, and Playback. The modules share a starkly simple interface—the TV window; a few buttons for functions like stop, start, and fast forward; and a frame number display.

But behind the simple interface is a complete video architecture enabling a user to splice and dice clips; preview at different compression levels; control hardware such as tape decks, special-effects boards, and audio digitizers; and add new device drivers, compression algorithms, and other tools as they're released. Rafferty is also developing similar, file-compatible products for DOS and Windows.

Rafferty plans to "productize" his technology, but the tools will be most useful for other companies—for example, a publisher could include Playback on a CD ROM full of video, or a stackware developer could provide video support in an authoring system.

Rumors abound that Apple is developing video extensions for the Mac, but at press time it was unclear how Rafferty's software will compare with Apple's.

For information about licensing agreements, call Commotion Technology in Redwood City, California, at 415/367-4919.—**D.L.**

Large-Screen Graphics Boards for the LC and IIsi

SuperMac has designed 8-bit boards that support monitors as large as 21 inches diagonally for the Macintosh LC and the IIsi. The board for the IIsi, called the Spectrum/8 si, plugs directly into the IIsi's slot, making an adapter board unnecessary. The Spectrum/8 si is compatible with Apple monitors and with 16-inch, 19-inch, and 21-inch monitors from SuperMac and other vendors, according to SuperMac.

The board for the LC, called the Spectrum/8 LC, contains all the functions of the IIsi board and draws only 4 watts, well within the LC's power budget. Both boards have a 75Hz refresh rate to eliminate flicker.

Both boards also come with SuperMac's hardware pan-and-zoom feature, and the company's Virtual Desktop, which effectively increases resolution to 4096 by 1536 for viewing large documents.

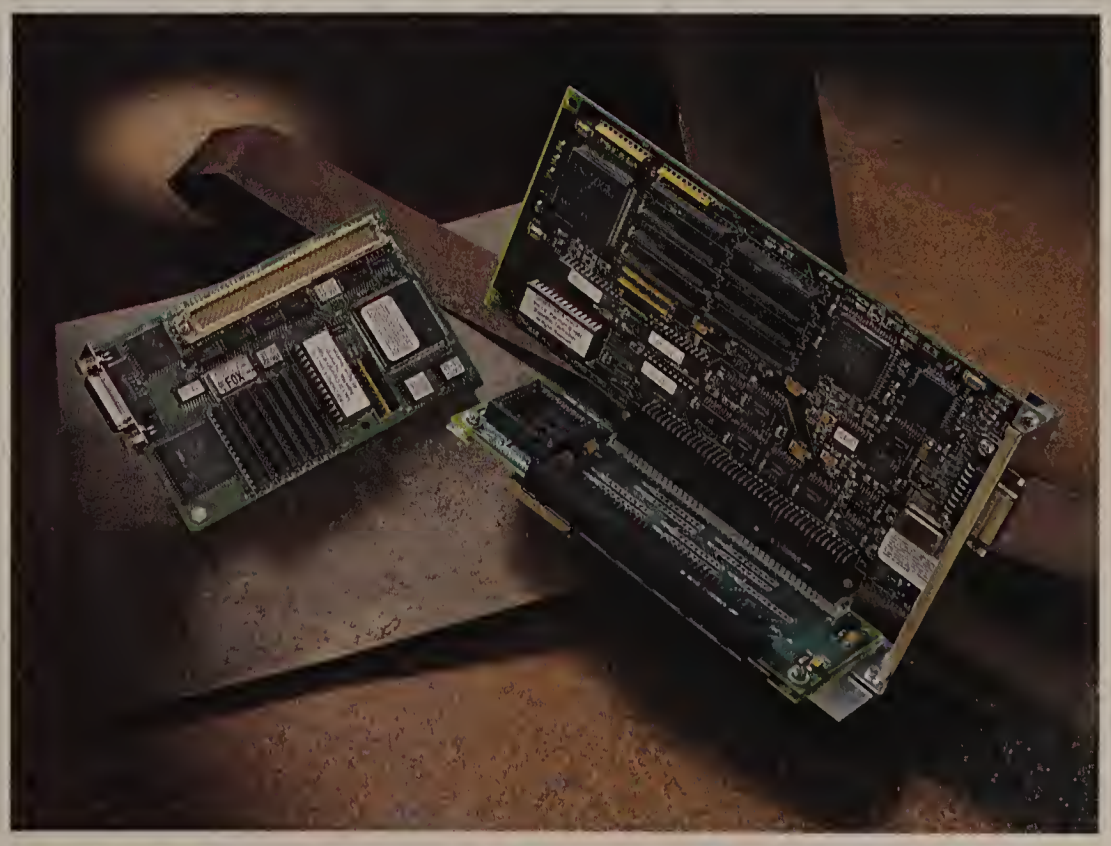
SuperMac began to ship the new products in late March. The suggested retail price is $999 for either board. The company is also offering for $189 a 68882 math coprocessor that plugs into the Spectrum/8 si. For more information, contact SuperMac in Sunnyvale, California, at 408/245-2202.—**T.M.**

The Thinking Mac's Book

With 26 million copies in print, Jacqueline Susann's *Valley of the Dolls* is the best-selling novel of all time. Freelance writer and self-taught artificial intelligence expert Scott French hopes to duplicate its success with *Just This Once,* a Susann knockoff written with the help of expert system software running on a Macintosh IIcx.

Both novels focus on the drug and sex addictions of music and movie stars. Both have the same

(continues)



ERIC HARGER

SuperMac's 8-bit color boards for the Macintosh LC and the IIsi, the Spectrum/8 LC (left) and the Spectrum/8 si, support 16-inch, 19-inch, or 21-inch color monitors.

Now you can travel from here to there with twice the horsepower.

Getting from your Macintosh to virtually any fax machine in the world is now a lot faster.

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As an added plus, the new InterFax also works as a 2400-bps Hayes-compatible data modem with MNP 5 error correction. All these features together made *MacUser* name the InterFax 24/96 the best communication product of 1989.

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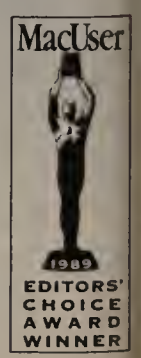

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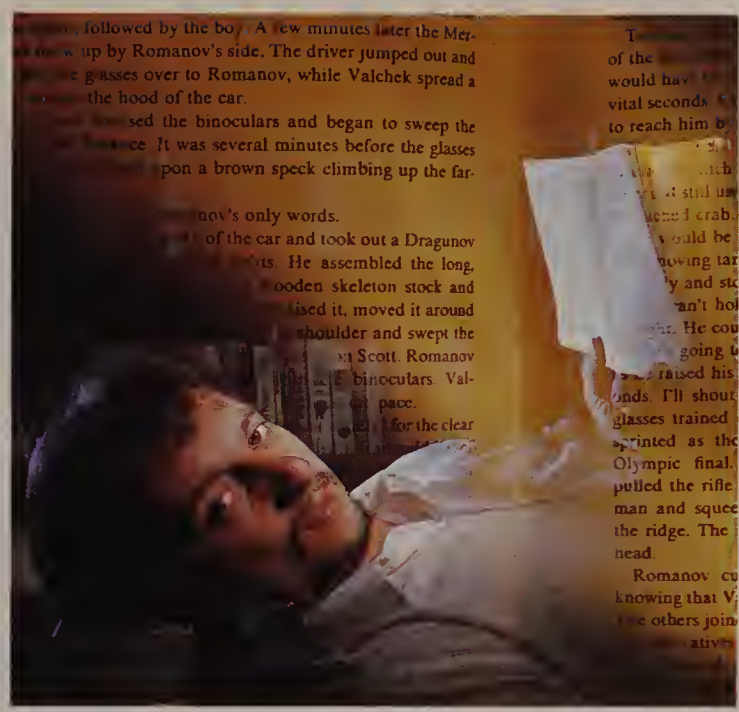
Introducing the Interfax 24/96

Circle 43 on reader service card

style, and for the most part, both use the same vocabulary. French analyzed the entire text of *Valley of the Dolls* for parts of speech, words associated with particular characters, words relevant to a time in the story, and so on. He updated the vocabulary with terms for freebasing cocaine and for describing sex in greater detail than Susann did in 1966.



ROBERT HOLMGREN

Is it writing, or is it programming? Scott French wrote a pulp novel with the help of Nexpert Object.

French developed his expert system with Neuron Data's Nextra and Nexpert Object. Nextra helped him convert his study of Susann's style into rules for advancing the plot, determining characters' emotional reactions, and selecting words; Nexpert Object applied the hundreds of rules.

French claims that he wrote about 10 percent of the text without the Macintosh, the Mac wrote 25 percent without him, and the two revised each other's work to produce the rest. French remained in control, of course, feeding the computer suggestions about characters and situations, to which it responded with text that he then edited to eliminate irrational dialogue or action. The computer seems to have worked somewhat like an in-betweener, an animation artist who draws the frames in between key frames drawn by a master animator.

French acknowledges that his system can imitate only linear, straightforward writing without complex syntax and metaphor or great intuitive leaps. Many best-sellers have none of these qualities, though, and *Just This Once* raises high-stakes intellectual-property issues. He has not sold the book yet, but French's literary agent describes it as "very commercial" and has found French a copyright attorney to fend off a lawsuit that is now threatened by Susann's estate.

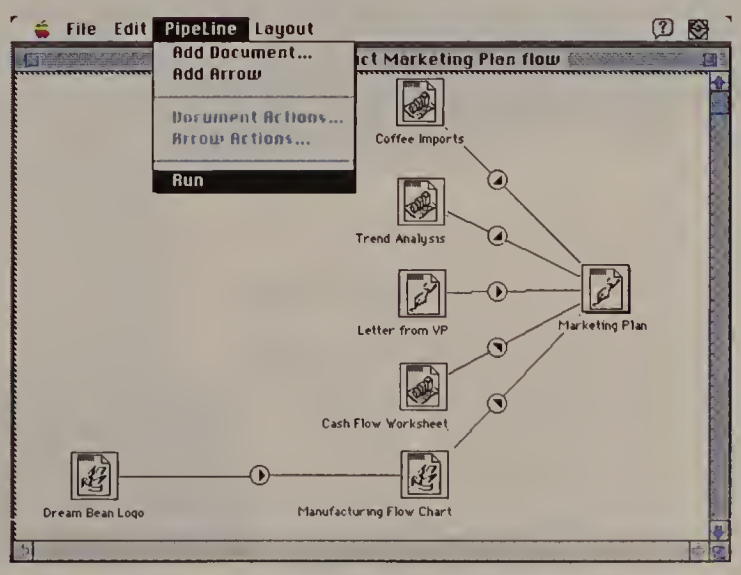
Neuron Data is in Palo Alto, California, at 415/321-4488.—**Ann Garrison**

The Spirit of 7-Point-0

Those Apple patriots in the Claris building at the corner of Bunker Hill Lane and Patrick Henry Drive are getting ready for some System 7.0 action. On the Claris roll call are

- MacWrite Pro
- PipeLine, a tool for managing the tangled web of published and subscribed-to files (not expected to be released this year)
- Resolve (a spreadsheet based on Wingz)
- MacProject II 2.5
- HyperCard 2.1
- programmers' guidelines for making other applications able to communicate with Claris applications

MacWrite Pro is the big news. It has real style sheets for both characters and paragraphs, tracking, a Word-like section feature, and a frame-based interface that can wrap text around graphic elements the way RagTime and QuarkXPress do. MacWrite Pro will support external add-ons and will ship with one for creating tables and another for adding notes. The program is expected to list for $249.



The shape of things to come: Claris's PipeLine is a good example of the new utilities System 7 will spawn.

Resolve looks a lot like Wingz but, in addition to 7.0 features, Resolve adds such Claris standards as the Claris spelling checker and the MacDraw tool palettes. Resolve's new interface has some nice touches, like including the arguments when you paste a function into a cell, and, says Claris, Resolve lacks bugs provided in the Informix product. Resolve will list for $399.

HyperCard version 2.1 and MacProject II 2.5 are 7.0-smart upgrades. For example, MacProject, which will list for $499, will be able to run Resolve scripts to generate and update graphs inside MacProject files, and Resolve will be able to use HyperCard 2.1's Data Access Language support to bring mainframe data into worksheets.

For more information, contact Claris in Santa Clara, California, at 408/987-7000.—**D.L.**

HP Unveils 4-ppm and 17-ppm Printers

Hewlett-Packard has recently introduced the HP LaserJet IIIP and the HP LaserJet IIISi, laser printers that produce 4 pages per minute and 17 pages per minute, respectively. The LaserJet IIIP improves on the existing LaserJet IIP, with higher performance and HP's Resolution Enhancement Technology (RET).

The 300-dpi IIISi, HP's first venture into high-speed laser printers for personal computers, also includes

(continues)

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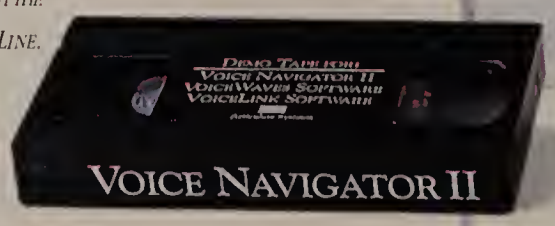

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RET and has a toner cartridge that contains unusually fine toner particles. This combination produces output rivaling that of printers with 600-dpi resolution, according to HP. The IIISi incorporates a RISC processor for faster printing. The printer has two 500-sheet input trays and produces up to 50,000 printed pages a month.

The IIISi lists for $5495 and began shipping in volume in early March. An option for printing on both sides of the paper also began shipping in March at a suggested list price of $695. A power envelope feeder going for $495 should be available this summer.

Neither printer is currently available in a model designed specifically for the Mac, but Macintosh users can adapt the IIIP with the $275 HP AppleTalk Interface Kit, an additional 1MB of LaserJet RAM that lists for $230, and the $695 HP LaserJet PostScript Cartridge. The IIISi can connect to Macs (and PCs at the same time) via the BridgePort 2674, a $595 intelligent switching device from Extended Systems. Hewlett-Packard said it expects to offer both printers in Mac versions sometime in the fall.

For the IIISi to work with the BridgePort 2674 (and thus the Mac), it must have HP's $895 PostScript upgrade, which includes extra RAM. Extended Systems is currently shipping the BridgePort 2674.

ANNE NADLER

The $895 Radius FPD full-page display works with the Classic and with most higher-end Macintoshes.

For more information, contact HP at 800/752-0900, or Extended Systems in Boise, Idaho, at 208/322-7575.—**T.M.**

Radius Reintroduces Its Full-Page Display

Despite the apparent success of the monochrome Radius Pivot monitor and the recent introduction of the Color Pivot, Radius has decided to reintroduce the Radius FPD, a full-page display that is fixed in portrait mode but costs several hundred dollars less than the monochrome Pivot. The company says it was influenced by the tremendous success of the Macintosh Classic and Mac LC systems. When the first Pivot was introduced, in March 1990, the company discontinued its original FPD, which had been the first full-page monochrome monitor for the Mac. Radius said at the time that it expected to compete through high volume and by offering the additional feature of pivoting, but conceded that the mechanically complex Pivot monitors are inherently more difficult and costly to make.

The new Radius FPD lists for $895 and has been improved over the old model, Radius says. The monitor offers a resolution of 640 by 870 pixels at 78 dpi, and comes with RadiusWare screen-utility software. Although it works in monochrome with the Classic, the FPD can provide gray scale when connected to a Mac with built-in video or an adapter board. The FPD is currently incompatible with the Plus or other monochrome Macs that lack expansion slots.

The Radius FPD began shipping in the middle of April, according to the company. Radius began offering a series of adapter boards for the FPD at the same time. The monochrome adapter boards for the Classic and SE list for $295, while boards for the LC, SE/30, and Macs that include the NuBus have a list price of $395. For $795 Radius is offering an 8-bit adapter board for the Mac LC. For more information, contact Radius at 408/434-1010.—**T.M.**

STEVEN BARATZ

The HP LaserJet IIISi prints 17 pages per minute, while the HP LaserJet IIIP produces 4 ppm. Both printers incorporate HP's Resolution Enhancement Technology.

Big Words

The dearth of Mac products for retrieving information from gigabytes of text on hard drives or CD ROMs is both cause and consequence of the Mac's weak presence in insurance and legal offices, government, and other text-in-

(continues)

Arrange your files, folders and applications to fit the way you work, and your hard drive won't be so hard to handle.

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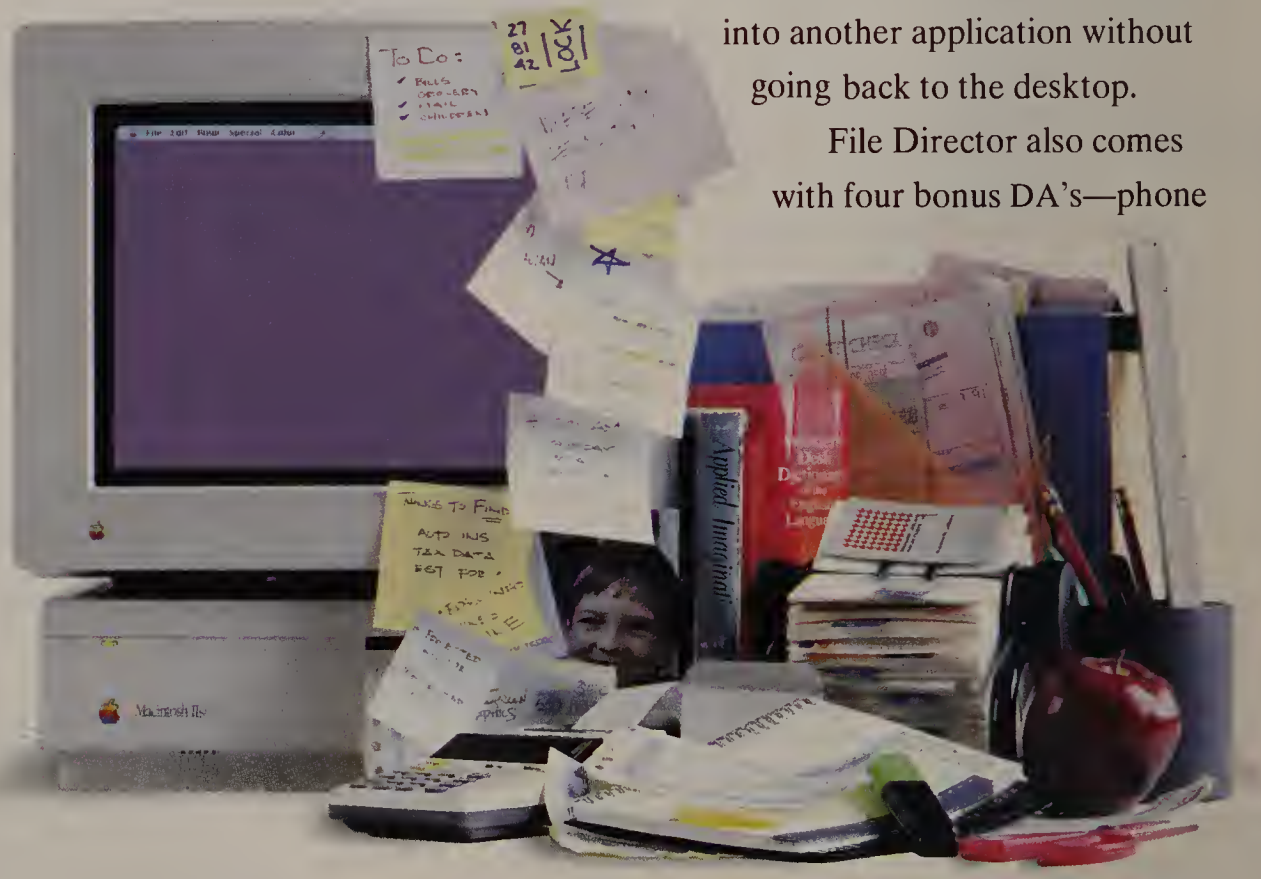
File Director also comes with four bonus DA's—phone



Got half a mind to get organized? Get File Director.

pad, calendar and two calculators—that come in handy for taking and making calls, setting up appointments and crunching numbers. All without quitting your application.

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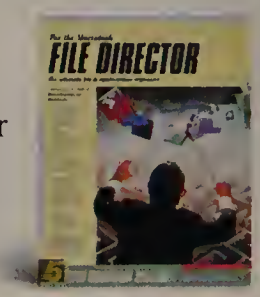
And keep this in mind. We'll send you a free copy of Pyro!,™ the entertaining screen saver (a $39.95 value), just for writing "Pyro!" on the File Director registration card before you return it. For more information, call 1-800-477-8212 today.



File Director from Fifth Generation Systems, Inc.

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MANUELLO PAGANELLI

***Congressional Quarterly*'s information systems director Ron Knott (left) and publisher Neal Skein. *CQ* runs on Personal Librarian.**

tensive areas. Now one of the most interesting text-searching products for UNIX and Windows is being moved to the Mac.

The Mac version of Personal Librarian (as the Windows version is called—the Mac product is still unnamed) will have some unusual features including the ability to automatically generate a list of terms related to a search term. For example, in searching the complete text of last year's *New York Times* for the word *Nicaragua,* Personal Librarian might recommend also searching for *Chamorro, Contra, Miami,* and *Ortega.* Personal Librarian can search using adjacency and proximity, root-matching, and wild cards, as well as Boolean operators and a more accurate technique called *post-Boolean.* Retrievals are ranked by relevance.

The first Mac version's feature set is not completely fixed. Features in the works include support for bitmapped images in a database; forms-design tools for customizing the interface and simplifying searches of structured data (for example, a newspaper database with article date, author, and headline in separate fields); support for SGML (the federal government's standard file-description system), including hypertext jump-to buttons; and support for non-text-based hypermedia data types, such as sound.

Personal Librarian is built on Callable Personal Librarian (CPL), a set of programming tools available separately for developing custom systems. CPL developers can create applications that read, index, and display external files such as archived word processor and page-layout files. The programming tools also support indexing and searching of incoming data in real time—for example, from a news wire.

Pricing for the Mac product will probably be about the same as for the Windows product, which lists for $895. CPL starts at $20,000. For more information, call Personal Library Software in Rockville, Maryland, at 301/926-1402.—**D.L.**

QMS and NEC Printers Work with Macs and PCs

Both QMS and NEC Technologies have introduced 8-ppm laser printers that can work with Macs and PCs over a network. The QMS printers are the QMS-PS 815 and 825; both feature a new Canon print engine with improved front-panel LCD controls. The 815 and 825 offer QMS's Emulation Sensing Processor, which senses whether an incoming file is in PCL (on the PC side) or PostScript (from a PC or Mac). Both QMS printers use a 20MHz 68020 microprocessor that speeds up the rasterizing of the print image. The only difference between the two is that the 815 has just one 200-sheet paper feeder, while the 825 has two. Both printers accept letter- or legal-size paper and come with 45 PostScript fonts. They also have buffers that allow their AppleTalk, parallel, and serial ports to all accept data at the same time.

The NEC SilentWriter2 990, designed for stand-alone use or for small graphic arts or CAD/CAM workgroups, can also accept PostScript or PCL files, but only accepts one file at a time. Users must go to the printer and manually select the AppleTalk port, parallel port, or serial port if the desired interface is not already chosen. Macintosh users sending PostScript files will get a "printer not found" message if the printer is not set to receive via AppleTalk. For DOS machines, NEC includes a utility called the NEC Printer Control Panel (from LaserTools), which appends a header to files, telling the printer whether the files are in PostScript or PCL.

The SilentWriter2 990 has a Weitek XL-8200 RISC processor that makes the printer as much as seven times faster than most PostScript printers, according to NEC. The printer comes with 2MB of RAM, 35 Adobe fonts, and an emulation of the Hewlett-Packard LaserJet IIP that includes 12 fonts for PCL. It has one 200-sheet feeder for letter- or legal-size paper. To accommodate an external hard drive that could store forms and additional fonts, the NEC printer has a SCSI interface. The NEC printer and the QMS printers all have 300-dpi resolution.

(continues)

JEANNE STACK

The NEC SilentWriter2 990 (left) and the QMS-PS 815 can tell if a file is PostScript or PCL. The NEC printer has a speedy RISC processor; the QMS accepts several files at once.

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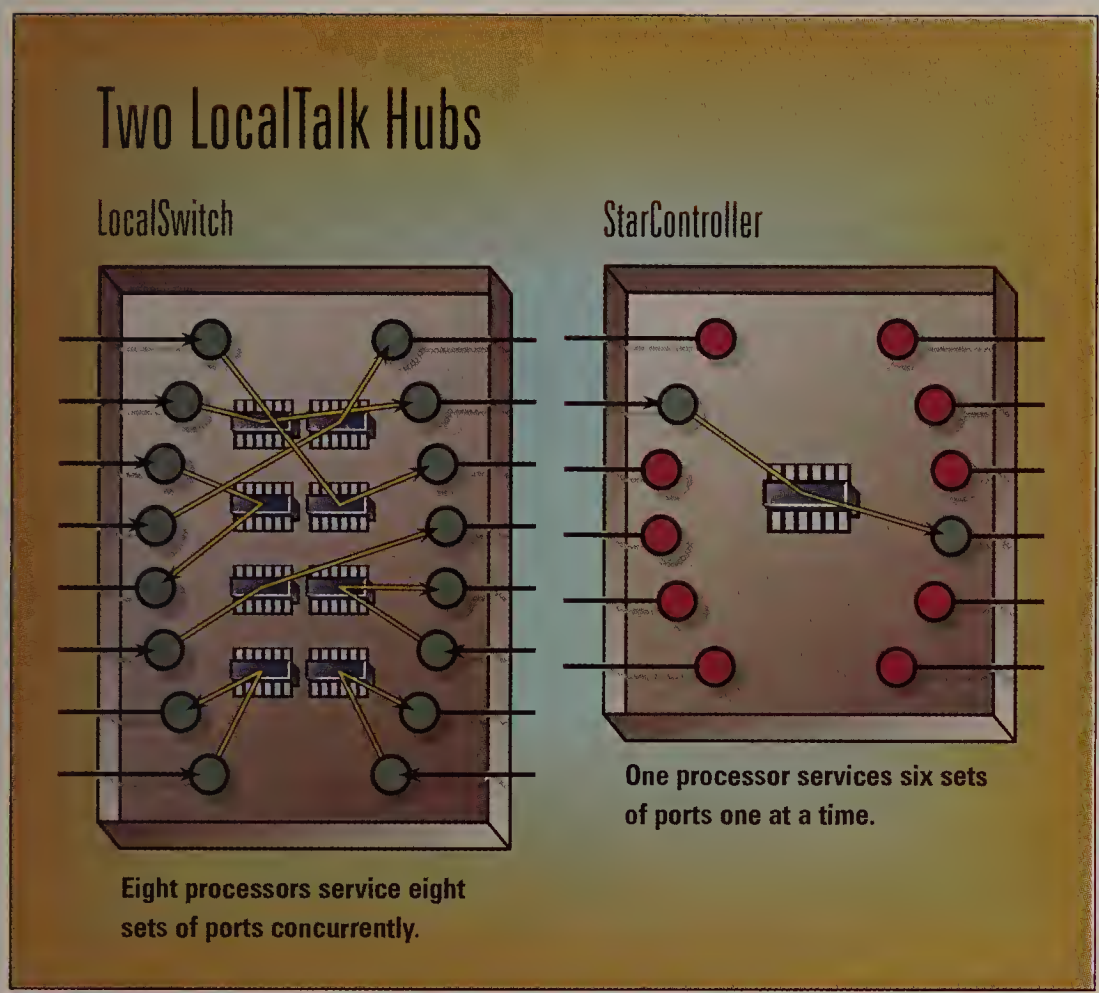

The SilentWriter2 990, shipping now, has a suggested list price of $4495. The QMS-PS 815 and the QMS-PS 825, both also shipping, list for $4995 and $5995, respectively. For more information, contact NEC in Boxborough, Massachusetts, at 508/264-8000, or QMS in Mobile, Alabama, at 205/633-4300.—**T.M.**

Birth of a Star

Like hot gases speeding away from the center of the universe, Macintosh network technology is coalescing into stars.

Farallon's StarController and Nuvotech's TurboStar are facing competition from a new kind of network switching-hub. A new company, Tribe Computer Works, whose president Jim Li previously worked on Thinking Machines' parallel-processing supercomputers, is applying the strength of multiple processors to Tribe's LocalSwitch star-configuration network hub.

The LocalSwitch is a 16-port hub with 8 microprocessors; each links a pair of ports for incoming and outgoing signals. For example, when a user prints a file, it goes from the Macintosh to the printer selected in the Chooser, whereas a StarController's single microprocessor broadcasts the print request out of every port, relying on the selected printer to catch the job.

LocalSwitch's design has several advantages. It should be able to maintain throughput for up to eight connections at or near LocalTalk's 230Kbit maximum speed, whereas a StarController switches a single 230Kbit link between ports. Also, because the LocalSwitch narrowcasts its packets, it provides greater security from network snoops. However, a 16-port LocalSwitch ($3495) costs about twice as much per port as a StarController ($1295). You can connect LocalSwitches to each other—to form larger networks—without routers, or through routers you can connect LocalSwitches to other networks such as Ethernet. The StarController and the LocalSwitch include network-management software.

TOM JACKSON

Jack Albright, systems consultant, is testing Instant Update at Du Pont's Printing and Publishing division.

Both companies are located in Emeryville, California, Farallon at 415/596-9000, and Tribe Computer Works at 415/547-3874.—**D.L.**

Look Who's Talking Now

In March, On Technology shipped a group calendar and meeting scheduler called Meeting Maker. Now it's preparing a tool that—let's hope—makes meetings obsolete.

Instant Update is like an electronic whiteboard that you can check when you have a spare moment, or like an E-mail system that files messages for everyone on a network in one big document, instead of as a series of separate notes, and provides each person with a different view of the master file. For example, several medical researchers might collaborate on writing an article. As each one completes an experiment or a statistical analysis, he or she adds the results to the master file. The next researcher to open that file can click on a button to update his or her view of the file.

The only comparable product on the Mac is Information Research's Syzygy, but Syzygy requires everyone to work on a file at the same time. Unlike Instant Update, Syzygy works via modem (On Technology's product will add this capability later) and provides draw and paint tools. Instant Update can create tables and can search for text by its contents and by who wrote it.

Instant Update supports XTND technology, so the program can read and write to Microsoft Word or other word processors, but under System 6.0.X it can't maintain live links to them.

The program will list for $495 for two users and $995 for five users. For

(continues)

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MacWorld
January, 1991

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MacroMind
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"The Bernoulli is immune to head crashes, power failures, and other catastrophes to which hard disks are susceptible."
BMUG Newsletter
June, 1990

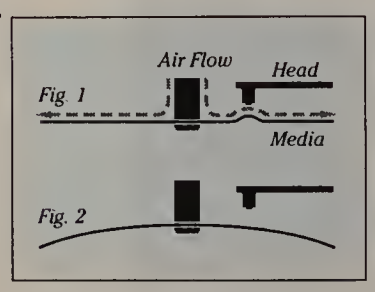
"In terms of data security, this product [Bernoulli] is way ahead of the competition: it is the only one impervious to head crashes."
PUBLISH!
January, 1991

BERNOULLI MEANS SECURITY FOR YOUR DATA

A lot of people have had something to say about Bernoulli Technology® lately. Probably because this unique technology makes Bernoulli® removable-disk drives so much more than other removable storage systems. More reliable. More powerful. More transportable. In short, more of what you need in a removable-disk drive.

A word about Bernoulli Technology.

Crash-resistant—that's the key to Bernoulli Technology. Bernoulli was designed from the ground up to protect your data from the rigors of removability.



Bernoulli's sophisticated aerodynamics create an air flow, causing the flexible disk to fly up to within 1/100,000 of an inch of the read/write head without touching it (fig. 1). As the disk flies at high speed, it becomes rigid, giving you hard-disk-like performance. If the air flow is interrupted by a jolt, power surge, dust—you name it—the media simply falls away from the read/write head (fig. 2). No contact. No head crash.

Bernoulli's removable data disks take care of your data as well. In fact, they're so rugged that they can withstand an 8-foot drop to a hard surface (let alone a trip in your briefcase or the mail).

MacUser 2/91

A word to the wise.

Consider—because all removable-disk drives are not the same. And the more you value your data, the more you should weigh the differences. From company service and support to system software, right down to the technology itself.

Call 1-800-777-3057.

Discover why people are talking about Bernoulli. Call for a free brochure. Then maybe you'll have a few choice words for Bernoulli yourself.

IOMEGA®
The Makers of Bernoulli

Circle 260 on reader service card

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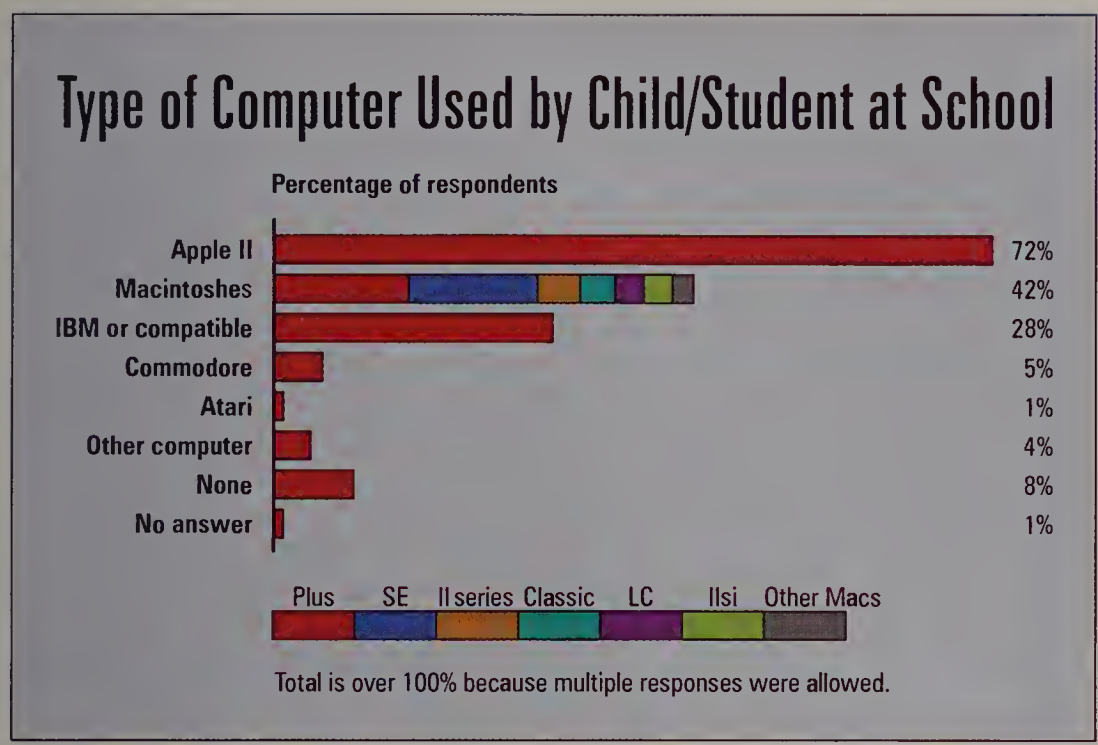


The most common computer in grades K–12 is still the Apple II, with the Macintosh placing a strong second. Low-cost Macs have made respectable inroads since their October debut.

further information call On Technology in Cambridge, Massachusetts, at 617/876-0900.—**D.L.**

Survey: Macs in Education

This month's reader survey covers the use of Macintoshes and other personal computers in grades K–12. Among respondents, 35 percent are parents, 4 percent are teachers, and 7 percent are both parents and teachers. The Apple II dominates in schools: 72 percent of responding readers who are parents or teachers say that their children and/or students use the older Apple family of computers. The Macintosh comes in second, with 42 percent of the parents/teachers citing the Mac. IBM PCs and compatible systems are mentioned by 28 percent, Commodore systems by 5 percent, and Atari systems by 1 percent. Other computers are reported by 4 percent. Only 8 percent of the parents/teachers say that their schools have no computers. The figures add up to more than 100 percent because of multiple responses.

Although the Mac SE is mentioned by 19 percent of parents/teachers and the Plus by 19 percent, the newer low-cost Macs are already appearing in schools in fairly significant numbers. The Classic is cited by 5 percent of readers, the LC by 4 percent, and the IIsi by 4 percent. Other Macs account for 3 percent.

The age breakdown for children or students who use Macs is 10 percent in kindergarten, 20 percent in grades 1 to 3, 24 percent in grades 4 to 6, 19 percent in grades 7 to 9, and 24 percent in grades 10 to 12.

The most-mentioned application is games/entertainment, cited by 63 percent of parents/teachers. Word processing is second at 62 percent, while course-specific software is third at 47 percent. Databases and music follow at 16 percent and 14 percent, respectively. Other applications are cited by 17 percent of responding parents/teachers.

When asked the main advantage of having computers in the classroom, 35 percent of all responding readers say making learning fun, 31 percent say improved problem-solving skills, and 13 percent cite gaining job skills. —**T.M.**

VIRUS WATCH

Current viruses, Trojan horses, and worms affecting the Macintosh community.

HC

Type: Data virus
First listed in Virus Watch: 6/91
Info: Infects HyperCard stacks.
Impact: Causes the Mac to hum oddly. At press time *Macworld* did not know if HC is destructive.

nCAM

Type: Virus
First listed in Virus Watch: 5/91
Info: An nVIR clone.
Impact: Nondestructive; infects applications and system files; can cause crashes.

MDEF D

Type: Virus
First listed in Virus Watch: 5/91
Info: Infects applications and system files.
Impact: Nondestructive; can cause crashes.

Aldus Opens Up PageMaker

Aldus is developing two sets of tools for modifying PageMaker. One is an English-like scripting language for controlling PageMaker, and the other is Aldus Additions, an interface that enables programmers to write external applications that plug into PageMaker.

The scripting language will be able to automate executing any PageMaker command, for performing such tasks as extensive formatting of imported text and pasting up pages. Users will be able to script a task in text mode while inside PageMaker and then have PageMaker execute the script, similar to running a script in HyperCard. A later version or an Aldus Addition will provide more advanced procedural commands as well.

The Aldus announcement is clearly a response to Quark's Xtensions, a set of programming tools for writing custom plug-ins for QuarkXPress. Third-party developers and Quark have published numerous Xtensions, but Aldus would not say whether it plans to publish Aldus Additions or leave the market strictly to outside developers.

At press time, Aldus had not established pricing or a release date for either piece, but expects to complete the programming interface first. For more information, contact Aldus at 206/622-5500.—**Luis Camus**

COMPUTER BUSINESS TODAY
AN 8-PART SPECIAL EDITION

In Today's tough competitive corporate climate timely technology decisions can have a profound effect on a corporation's performance capabilities, at every level.

"Computer Business Today" is a fast-paced special edition of Business Today whose format is strictly application-oriented "Hands On" information, with the end user in mind.

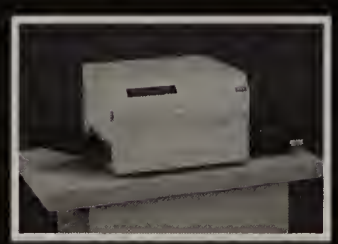
An Elite assembly of the industry's state-of-the-art products will be showcased each week beginning May 12. Pictured below is a representative window to a range of technologies featured that harness the impact of computer technology to create and solve task-specific applications from Color Presentations to Connectivity -- solutions that today's marketplace demands.

"OS" series of cost recovery systems by Infortext Systems -- for organizations that need to control costs for, or charge for telephone usage, copier activity, faxes or word processing -- 25-40% telecommunications savings realized.

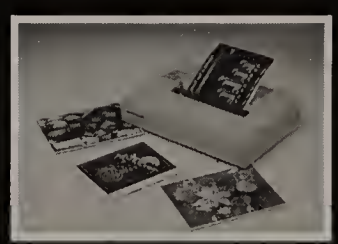
"Bernoulli Box" Transportable drive by IOMEGA -- featuring a removable 44MB data cartridge. Delivering the speed and reliability of hard disks combined with the flexibility, security and unlimited storage capacity of removable media.

Xircom's external Pocket LAN Adapters available for Ethernet, Token Ring and ARCnet, have set a new standard for convenience in laptop to LAN connectivity, by eliminating the need for an internal card.

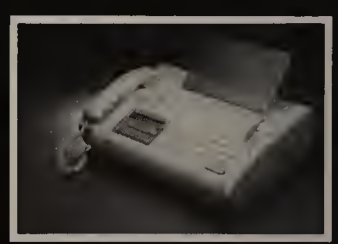
The SMART-UPS 600 by American Power Conversion -- providing complete power protection for high performance file-servers and critical workstations.



VariColor Publishing System by Varityper -- An integrated, low cost, color image processing system that allows users to combine high fidelity color and high productivity from a desktop solution.



HP PaintWriter by Hewlett-Packard for the Macintosh -- with the *power* and *versatility* to create high-quality, bolder, brighter colors.



Okifax 600 and 650 *with memory* by Okidata -- fully- featured machines, offering high image-quality and reliability at very affordable prices.

"Computer Business Today". For People who use computers. Tuesday evenings, Friday and Sunday mornings. Check your local listings for time and channel information.

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Tomorrow's Upgrade For Your Mac Is Only $59*

FREE! STEP-BY-STEP VIDEO INSTRUCTIONS**

A MacWarehouse Expansion Kit will dramatically increase the power of your Mac. And our fast, reliable overnight service will have your Kit in your hands tomorrow!

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Never again will you have to quit your word processor just to answer a question about a spread-sheet. Install extra memory and you can leave your letter open while you refer to last month's sales figures. You can edit those monstrous scanner files with advanced graphics applications or develop your own custom HyperCard stacks. More memory means more power at your fingertips.

PLUG IN INSTALLATION

Adding memory doesn't require technicians in lab coats. Just open your Mac, slide out the main circuit board and plug in your SIMMS. Our FREE video will give you STEP-BY-STEP installation instructions. Every type of Mac is covered and we think we've made it a breeze.

WHAT DO I NEED?

Our helpful sales and technical staff is standing by to answer any questions and take the mystery out out of memory upgrades. Memory cards come with one megabyte on each card and are usually sold in pairs - (2 @ $59 ea.).

The chart explains exactly what you need to achieve the desired level of performance.

To upgrade a 4-socket Mac Plus or SE to this amount of memory.	Do this: (Install in multiples of two only)
2 MB	Remove all four existing 256K SIMMs, install two 1 MB SIMMs, leave two sockets for future expansion.
2-1/2 MB	Remove only two 256K SIMMs, install two 1 MB SIMMs.
4 MB	Replace all four 256K SIMMs with four 1 MB SIMMs.
To upgrade an 8-socket Mac II, IIx, IIcx, oe SE 30 to this amount of memory.	**Do this: (Install in multiples of four only.)**
4 MB	Remove all four existing 256K SIMMs, install four 1 MB SIMMs, leave remaining sockets for future expansion.
5 MB	Keep existing 256K SIMMs, install four 1 MB in remaining sockets.
8 MB	Remove all four 256K SIMMs, install eight 1 MB SIMMs.

To open your Mac Plus or SE, you'll need a specially designed tool - it's available from us as part of a handy tool kit for just $9.

WHAT YOU NEED TO KNOW

Memory chips come factory-installed on plug-in cards, called SIMMS (Single Inline Memory Modules). Each one megabyte SIMMS card holds eight top quality, memory chips. We carry chips by all the major manufacturers like Texas Instruments, Intel and Samsung. We also carry the full line of Dove memory products.
Prices can vary a lot, based on quality, speed and demand. At press time our price for 1MB, 100ns SIMMs is $59. Please call for the very latest prices and availability. Our sales staff will tell you what you need and help you make your choice an easy one.

SPEED

Do you need 80, 100 or 120 Nanosecond (ns) chips? Nanoseconds are billionths of a second, so an 80 ns chip responds faster than a 100 ns chip. The original Mac used relatively slow 150 ns memory chips. The 68020 processor reads 120 ns (or faster) chip, and the 68030 Macs like the speedier model.

OVERNIGHT DELIVERY

Place your order by 12:00 am (E), weekdays and we'll deliver overnight for just $3.00. There's never been a better time to consider a memory upgrade. Call our toll-free number now and tomorrow morning your Mac will be off to a brand new start.

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* SIMMs prices vary. Call for latest information.
** Limited Offer! Free video with purchase of 2 or more SIMMs.

MWG1P

GUARANTEE

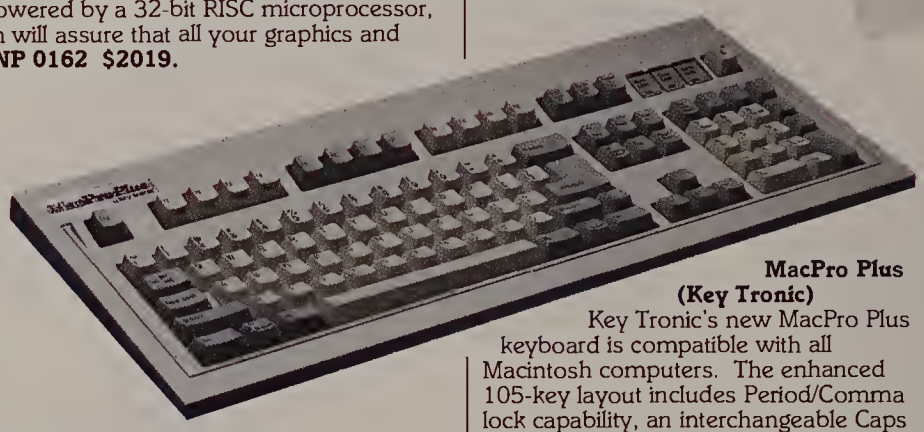
Many of our products come with a thirty day money back guarantee, if you are not completely satisfied. Ask for details when you place your order.

TrueLaser Printer (Microtek)
This revolutionary new laser printer gives you, for the first time, TrueImage support, plus PostScript and PCI compatibility, at phenomenal performance speeds. It comes with TrueType fonts, the same font technology that will go into every Macintosh running System 7.0 and IBM running Windows 3.1. And TrueLaser is smart enough to automatically switch between different printer interfaces—AppleTalk, Centronics, RS-232C—all transparent to the user. It's powered by a 32-bit RISC microprocessor, AMD's Am29000, and it's 300 dpi resolution will assure that all your graphics and layouts will come out looking their best. **INP 0162 $2019.**

Microsoft Excel 3.0 (Microsoft)
Microsoft Excel 3.0 offers many dramatic improvements in spreadsheet operations. You can place cells, graphs, and text anywhere, on the same page. Excel's Toolbar (with Autosum) automates common operations to save you time. The outliner expands spreadsheets to show detail, or contracts them to show broad structure. You can display your data with 68 different chart types, 24 in 3D. Excel also accesses remote databases through Apple's Data Access Language (DAL). Add support for System 7.0, plus goal-seeking and equation solving, and Excel will stimulate you to look for new problems to solve.
BUS 0167 $309.

ACCESSORIES

Toner Cartridge
LaserWriter II ..... 105.
Basic Needs, Inc.
ACC0356 Dust Cover - Mac II & Extended Keyboard (grey nylon) ..... 17.
ACC0348 HardTops ImageWriter II Cover ..... 17.
ACC0347 HardTops Mac Extended Keyboard Cover 16.
ACC0346 HardTops Mac Standard Keyboard Cover 15.
ACC0466 MacIIcx/ci Monitor Stand ..... 49.
ACC0351 Utility Pac ..... 15.
B.A.S.F. (BASF)
MED0030 Disks - DS/HD 1.44 Meg (box of 10) ..... 22.
MED0029 Disks - DS/DD (box of 10) ..... 12.
Curtis
ACC0469 Command Center ..... 89.
Ergotron
ACC0344 MacTilt II - 13" Color RGB ..... 75.
ACC0128 MacTilt Plus/512 - Platinum ..... 68.
ACC0009 MacTilt SE, SE/030 - Platinum ..... 68.
I/O Design, Inc.
ACC0028 MacLuggage™ Plus Carrying Case ..... 64.
ACC1070 MacLuggage™ SE Carrying Case ..... 75.
ACC0327 Monitorware Apple RGB Case ..... 79.
ACC0427 Ultimate SE Carrying Case - Black ..... 79.
ACC0440 Ultimate SE Carrying Case - Navy ..... 79.
ACC0529 Ultimate Classic Carrying Case - Black .. 79.
ACC0528 Ultimate Classic Carrying Case - Navy ... 79.
Kensington
ACC0459 Maccessories SE Radiation Anti-Glare Filter ..... 52.
ACC0097 System Saver Mac - Platinum ..... 63.
Mobius Products
ACC0055 Fanny Mac QT ..... 55.
ACC0247 SE Silencer ..... 39.
PowerUser™
BND0013 PowerUser Carrying Case w/Free Cap .... 69.
Sony
MED0031 Disks - 1.44 Mb High Density (3.5) ..... 24.
MED0003 Disks - DS/DD (box of 10) ..... 13.
Targus, Ltd.
ACC0251 Imagewriter II Carry Case (black) ..... 49.
ACC0438 MacIIcx/ci Carrying Case (black) ..... 79.
ACC0252 MacPlus/SE Carrying Case (black) ..... 65.



MacPro Plus (Key Tronic)
Key Tronic's new MacPro Plus keyboard is compatible with all Macintosh computers. The enhanced 105-key layout includes Period/Comma lock capability, an interchangeable Caps Lock and Ctrl keys. Also, the connecting cable you need is offered at no extra charge. The keyboard is backed by a limited lifetime warranty and unlimited toll-free product support. Includes offer for Tempo II, a keyboard macro package from Affinity Microsystems a $149.95 value FREE! **INP 0156 $145.**

ACC0250 MacPlus/SE- Ext Keyboard Carrying Case 79.
ACC0482 Premier Leather Case ..... 185.

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Checkfree Corporation
FIN0088 CheckFree ..... 21.
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FIN0044 ACC PAC Bedford Simply Accounting 1.1 ..... 139.
Inman
FIN0013 Business Sense ..... 129.
Intuit
FIN0043 Quicken 1.5 ..... 45.
Meca
FIN0039 Andrew Tobias' Managing Your Money 4.0 ..... 99.
Nolo Press
BUS0133 For The Record 2.0 ..... 32.
BUS0132 WillMaker 4.0 ..... 37.
Peachtree
FIN0059 At Once! ..... 285.
Reality Technologies
FIN0068 WealthBuilder (Mac) ..... 99.
Softsync/BLOC Publishing
FIN0048 Accountant Inc. Professional ..... 339.
Teleware, Inc.
FIN0087 M.Y.O.B. 2.0 ..... 139.
TimeSlips Corp.
FIN0129 TAL ..... 55.

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STA0010 StatView SE+Graphics 1.03 ..... 199.
STA0022 SuperANOVA (MacII Family) ..... 309.
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BUS0129 FastTrack Schedule 1.5 ..... 139.
DAT0055 AEC Information Manager ..... 409.
After Hours
DAT0076 TouchBASE ..... 89.
Aldus
BUS0066 Persuasion 2.0 ..... 329.
ASD Software, Inc.
BUS0134 Planisoft ..... 195.
BUS0146 Planisoft - 5 pack ..... 579.
BUS0147 Planisoft - 10 pack ..... 839.
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BUS0054 Full Impact 1.1 ..... SPECIAL! 59.
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ACC0489 MacLabelPro ..... 49.
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Casady & Greene, Inc
DAC0010 QuickDex ..... 36.
CE Software
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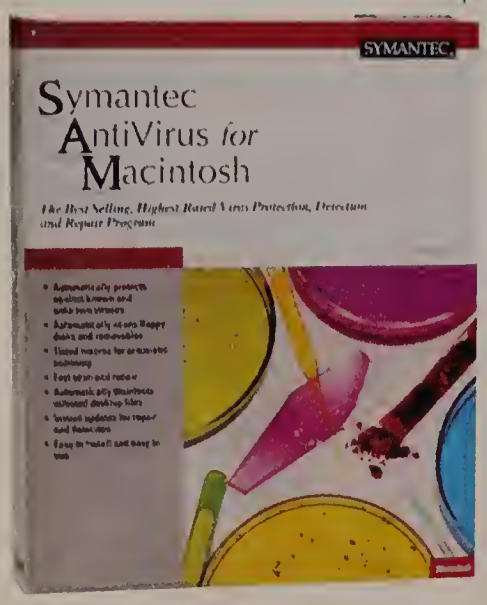
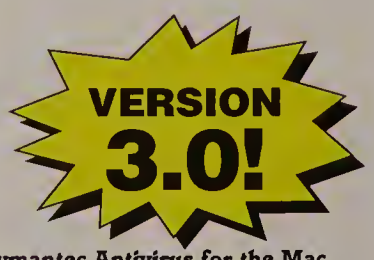
GRA0070 CalendarMaker 3.0 ..... 31.
Claris
DAT0064 FileMaker Pro ..... 215.
BUS0058 MacProject II 2.1 ..... 359.
BUS0065 SmartForm Designer ..... 289.

ScanMaker 1850S (Microtek)
A revolutionary new 35mm slide scanner that's perfect for desktop publishing, presentation graphics and multi-media applications. With the ScanMaker 1850S, you can scan 24 bit color and 256 shades of gray at up to 1850 dots-per-inch resolution. With a scanning area of 35mm x 35mm, it is versatile enough to scan slides in portrait and landscape mode. Included with every ScanMaker 1850S is a full version of the Eddy-Award winning Adobe Photoshop. **INP 0176 $2459.**



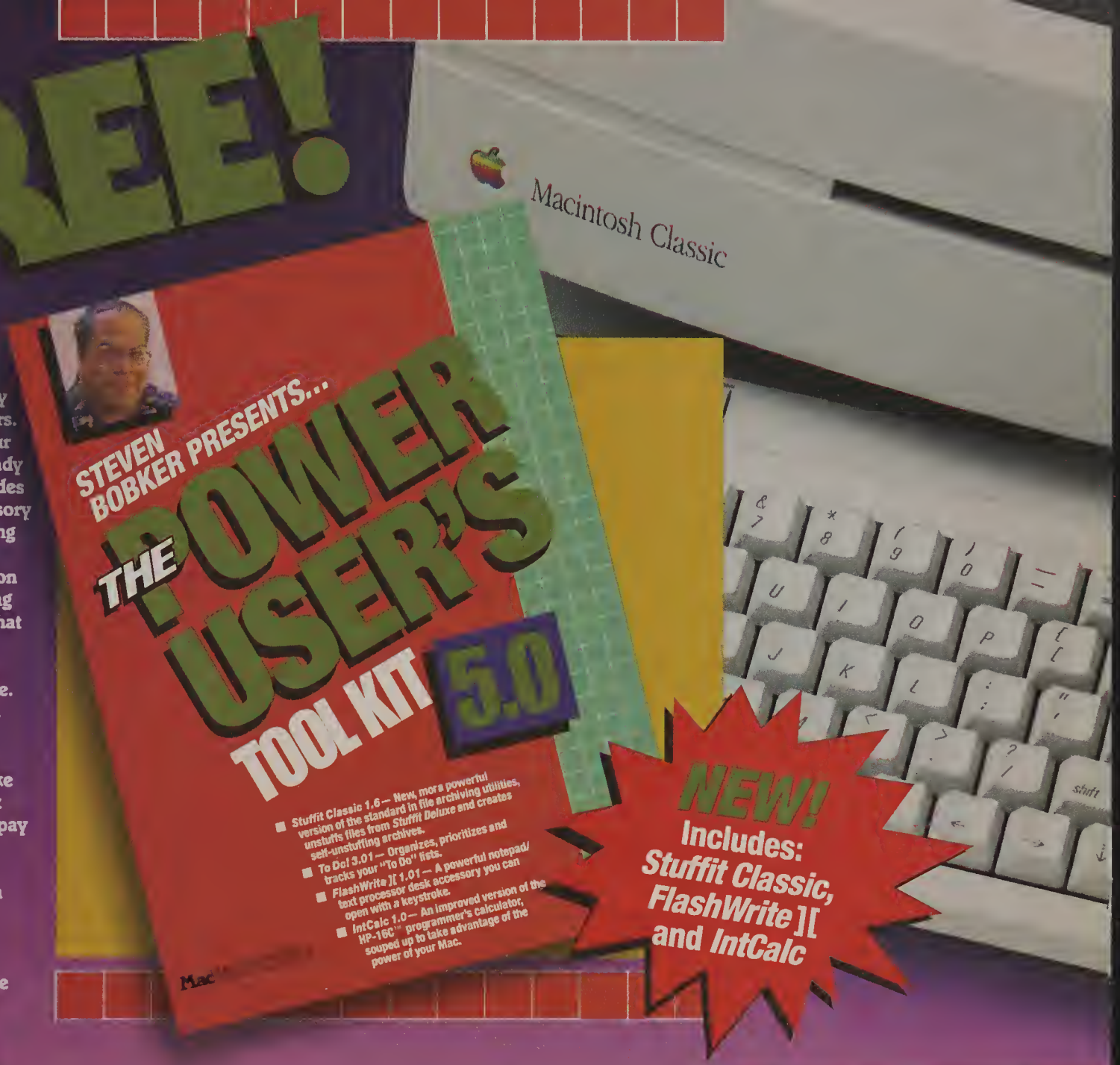


Symantec Antivirus for the Mac (SAM) 3.0 (Symantec)
The best selling, highest rated virus Protection, Detection and Repair program for the Macintosh is now even better. New SAM Version 3.0 has enhanced update and repair capabilities, and faster scanning. The INIT portions detect viral activity during startup. The CDEV portion detects viruses during normal usage and offers options for checking disks and folders. Audit Trail tracks your activity and your responses. Includes Virus Clinic, a stand alone detect-and-remove application you can run at any time.
UTI 0214 $65.

FREE!

The fifth edition of Steven Bobker's *Power User's Tool Kit* is now available exclusively to MacWAREHOUSE customers. A hand-picked collection of four powerful programs on one handy disk, the newest *Tool Kit* includes *To Do!* — a unique desk accessory for organizing and implementing your daily tasks. The newest version of *StuffIt Classic*, also on the disk, will create freestanding space-saving archives of files that you can expand whenever you need them without having any special decompression software.

The POWER USER'S TOOL KIT 5.0 is FREE from MacWAREHOUSE when you order from us. If you would like the disk, please ask for product code number AAA 0011. You pay only $1.50 for shipping and handling. The programs are shareware, so you can try them free of charge. If you wish to continue using them, some authors ask that you pay a fee ($10-$25). All of the details are explained on the disk, which is yours to keep.



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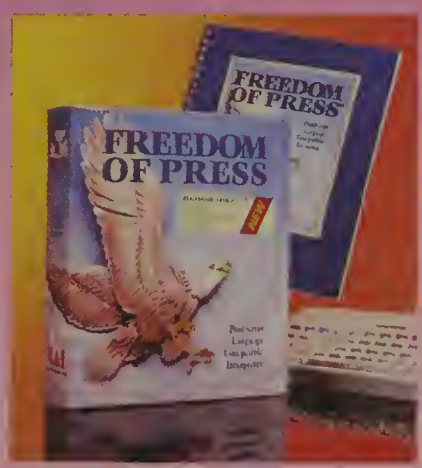

Freedom of Press Light for the Mac (Custom Applications)
Need the power of PostScript at a price you can afford? Use top-rated Freedom of Press Light to print your PostScript language documents on over 40 non-PostScript inkjet, dot matrix, and laser printers including HP DeskWriter, LaserJet and PaintJet. Works with PageMaker, Illustrator and Xpress. Includes 17 scalable, outline fonts and supports ATM and Adobe Type 1 fonts. **$55. UTI 0185**

MacDraft 2.1 (Innovative Data)
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CAD 0039 $279.

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BUS0064 Wingz 1.1 ..... 245.
JAM Software
DAC0032 Smart Alarms 3.0 (Single User) ..... 64.
DAC0033 Smart Alarms 3.0 (1-4 users) ..... 125.
Kaetron
BUS0100 TopDown 2.0 ..... 219.
Microsoft
BUS0167 Excel 3.0 ..... 309.
BUS0008 PowerPoint 2.01 ..... 245.
BUS0088 The Microsoft Office ..... 529.
BUS0014 Works 2.0 ..... 189.
On Technology
BUS0165 Meeting Maker 5-User ..... 299.
BUS0166 Meeting Maker 10-User ..... 559.
Portfolio Systems
BUS0101 Dynodex - The Instant Address Book ..... 72.
DTP0055 DynoPage ..... 72.
Power Up
BUS0096 Address Book Plus ..... 52.
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BUS0121 FastForms 2.0 ..... 105.
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BOK0026 Legal LetterWorks ..... 59.
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TopDown 2.0 (Kaetron)
Lets you create great looking flowcharts, organization charts, operating procedures, documentation sheets, and training materials quickly and easily. Instantly write, draw, and change your diagrams. Hide or show details in a hierarchy of drawing levels. TopDown's Custom Symbols, automatic line re-routing, text importing and exporting capabilities, 32,000 character Notecards, full color and pattern support and extensive On-Line Help make it powerful yet easy-to-use. **BUS 0100 $219.**

BUS0162 Informed Manager ..... 99.
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BUS0138 if:X Forms Designer ..... 169.
if:X Expense Reports ..... ea. 49.
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Adobe
FON0351 Type on Call ..... 47.
EDUCORP
CDR0010 Int'l. Graphics Library ..... 259.
EDU0198 Lingua-ROM ..... 455.
Wayzata Technology
EDU0194 The World Fact Book ..... 79.
Microsoft
BUS0019 The Microsoft Office CD-ROM ..... 599.

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NEC
CDR0020 CDR-36 CD-ROM Reader ..... 489.
CDR0019 CDR-ROM Reader w/ Type Gallery PS . 499.

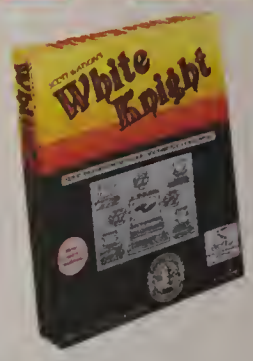
COMMUNICATIONS & NETWORKING

Beagle Brothers
NET0060 Flash ..... 129.
Caravelle Networks Corporation
NET 0099 Mac to Mac - 5 pack ..... 165.
NET0100 Mac to Mac - 10 pack ..... 229.
NET0101 Mac to Mac - 50 pack ..... 979.
CE Software
COM0054 In/Out (5 user Pak) ..... 128.
COM0041 QuickMail 2.2 (1 - 10 users) ..... 315.
CompuServe
COM0008 Membership Kit ..... 22.
COM0040 Navigator 3.0 ..... 49.
DataViz
COM0001 MacLink Plus / PC 4.5 ..... 129.
COM0052 MacLink Plus / Translators 5.0 ..... 109.
Dayna Communications, Inc.
UTI0116 DOS Mounter ..... 55.
Farallon™ Computing
COM0078 Liaison 3.0 ..... 279.
NET0005 PhoneNET® 128/512 ..... 35.
NET0084 PhoneNET® Manager's Pack ..... 669.
NET0007 PhoneNET® Plus, SE & II ..... 33.
NET0040 PhoneNET® Plus, SE & II - 10 Pack ..... 219.
NET0019 PhoneNET StarController® ..... 899.
NET0059 StarController™ EN (EtherNet) ..... 1739.
NET0058 Timbuktu® 2.0 - Remote Access Pack . 925.
NET0122 Timbuktu® 4.0 ..... 136.
NET0034 Timbuktu Remote® 2.0 ..... 135.

PhoneNET® Card for EtherNet:
NET0089 Nubus Mac II ..... 359.
NET0091 SE/30 ..... 359.
NET0090 Nubus 10-pack ..... 3259.
FreeSoft
COM0060 White Knight 11 ..... 85.
Hayes
COM0015 Smartcom II 3.2 ..... 84.
Insignia
UTI0174 AccessPC ..... 65.
COM0063 Soft PC AT/EGA Module ..... 125.
COM0045 SoftPC 1.3 ..... 245.
COM0091 SoftPC 2.0 for Mac Classic & LC ..... 139.
International Business Software
NET0097 DataClub - 3 Pack ..... 269.
NET0098 DataClub - 10 Pack ..... 539.
Microcom
NET0041 Carbon Copy Mac - single ..... 117.
NET0088 Carbon Copy Mac - twin ..... 189.
Prodigy
COM0056 Prodigy Starter Kit for the Mac ..... 27.
Sitka
NET0056 InBox Plus 3.0 ..... 1299.
NET0057 DOSTOPS 3.0 ..... 165.
NET0049 MACTOPS 3.0 ..... 187.
Software Ventures
COM0094 Microphone II 4.0 ..... 215.
Technology Works
NET0117 GraceLAN 50-User ..... 219.
Traveling Software
NET0045 Lap-Link III - Connectivity Pac ..... 99.

DESKTOP PUBLISHING

Aldus
DTP0045 PageMaker 4.01 ..... 499.



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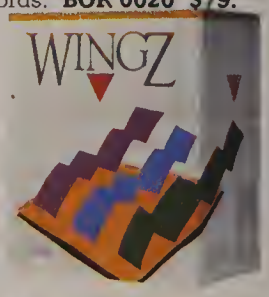

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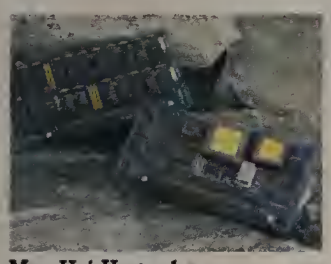

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Quark, Inc.
DTP0028 QuarkStyle ..... 199.
DTP0049 XPress 3.0 ..... 519.
Silicon Beach
DTP0040 Personal Press ..... 199.
TimeWorks
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INP0148 QuadraLink ..... 209.
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GRA0251 ColorSnap 32 Plus ..... 649.
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DRI0104 DaynaFile single 360K (5 1/4) ..... 499.
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DRI0256 DataPak MO 512 MB Read-write/optical ..... 3425.
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DRI0187 Xceed 8-bit Video Card NB6-48 ..... 349.
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MicroTech International, Inc.
DRI0294 Athena A100 100 Meg Drive ..... 899.
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DRI0376 Nova N50 Meg Drive ..... 565.
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DRI0251 Access CD ..... 789.
DRI0252 Access MF ..... 3995.
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Peripheral Land, Inc.
DRI0375 Infinity 88 Removeable Single ..... 1359.
DRI0193 Infinity Dual 40Mb Removable ..... 1619.
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HYP0034 HyperBible International Version 2.0 .... 125.
HYP0035 HyperBible King James Version 2.0 ..... 125.
Broderbund
GRA0268 Kid Pix ..... 29.

EDU0170 The Playroom ..... 29.
Davidson & Associates
EDU0037 Math Blaster ..... 29.
EDU0118 Math Blaster Mystery ..... 29.
Help Software, Inc.
EDU0108 Desktop Help for Excel ..... 52.
Learning Company
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EDU0048 Reader Rabbit ..... 30.

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MECC Marketing
EDU0190 Number Munchers ..... 29.
EDU0191 Word Munchers ..... 29.
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GRA0229 MapArt PICT Format ..... 95.
GRA0228 MapArt EPS Format ..... 95.
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EDU0142 MacKids Preschool Pack ..... 36.
Penton Overseas (Full line available)
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Personal Training Systems
Macintosh, HyperCard, FileMaker Pro, Microsoft Excel, Microsoft Word, Aldus PageMaker 4.0, Aldus FreeHand, Aldus Persuasion, Quark XPress 3.0 ..... ea. 52.
Queue
EDU0109 Computer SAT Prep ..... 57.
Visionary Software
EDU0207 LifeGuard ..... 49.
EDU0209 Synchronicity ..... 49.
Voice & Video
Getting Started Video: Excel 2.2, PageMaker 4.0, Word 4.0 ..... ea. 55.
Advanced Techniques Video: Excel 2.2, PageMaker 4.0, Word 4.0 ..... ea. 55.
EDU0063 HyperCard Getting Started Video ..... 55.
Zondervan Publishing House
BOK0021 MacBible - King James Version ..... 79.
BOK0020 MacBible - New International Version .... 79.

ENTERTAINMENT

Artworx
ENT0303 Bridge 6.0 ..... 29.
Broderbund
ENT0259 Shufflepuck Cafe ..... 25.
Where is Carmen Sandiego? ..... ea. 29.
Bulls City Software
ENT0308 Moriarity's Revenge ..... 35.
Bullseye
ENT0045 Ferrari Grand Prix 1.6 ..... 31.
ENT0046 Fokker Triplane Flight Simulator 2.8 ..... 25.
ENT0261 P51 Mustang 2.80 ..... 35.
Centron Software, Inc.
ENT0329 BlackJack Strategy Tester (w/ BlackJack Ace) ..... 65.
ENT0277 Casino Master ..... 45.
ENT0289 Casino Master Deluxe Mac II Version ..... 49.
ENT0257 CrapsMaster ..... 27.
ENT0264 BlackJack Ace ..... 27.
Electronic Arts
ENT0321 Earl Weaver Baseball ..... 32.
ENT0355 Harpoon ..... 39.
Sir Tech Software, Inc.
ENT0346 Bane of the Cosmic Forge ..... 35.
ENT0347 Wizardry II: Knight of Diamonds ..... 29.
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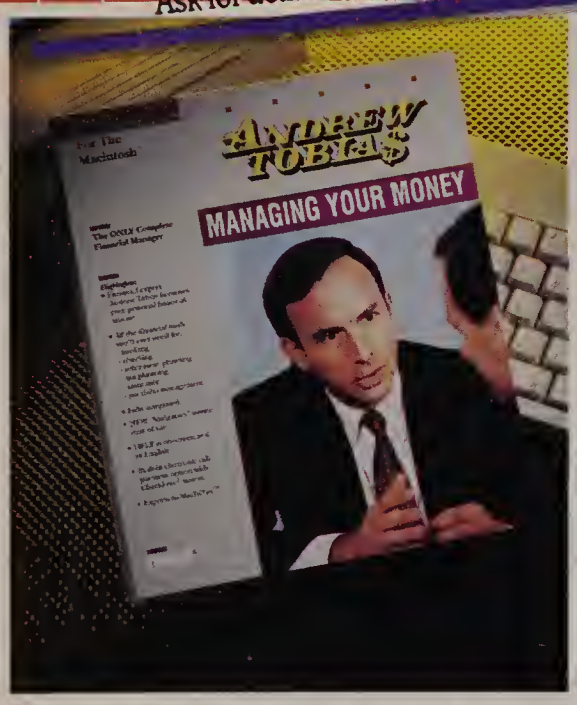

Andrew Tobias' Managing Your Money 4.0 (Meca Software) Managing your money is the most innovative personal finance package available for the Mac. Packed with powerful features including REMIND which records important dates, appointments and projects. MONEY, the heart of the program, tracks income, writes and prints checks, manages credit cards, creates budgets and more. TAX leads you easily through every corner of the tax law and determines your final bill. INVEST handles all stocks, bonds, options and mutual funds. PLAN financially plans for the years to come. **FIN 0039 $99.**

The Software Toolworks
ENT0281 Chessmaster 2100 ..... 32.
ENT0278 Life & Death ..... 32.
ENT0269 The Hunt For Red October ..... 20.
Three-Sixty
ENT0323 Sands of Fire ..... 32.
XOR Corporation
ENT0274 MacGolf Classic ..... 52.

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FON0264 Adobe Type Manager 2.0 ..... 59.
FON0351 Adobe Type Dn Call ..... NEW! 47.
Adobe Type Set 1 or 2 ..... ea. 65.
FON0326 Adobe Type Set 3 ..... 129.
Smart Art I, II, III or IV ..... ea. 65.
DAC0028 TypeAlign ..... 65.
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Altsys
FDN0183 Art Importer 2.0 ..... 89.
FDN0014 Fontographer 3.2 ..... 269.
FDN0284 Metamorphosis 2.0 ..... 89.
Broderbund
GRA0156 TypeStyler ..... 119.
Dubl-Click
FDN0081 MenuFonts 3.0 ..... 31.

Pacific Data Products
INP0153 Pacific MacPage ..... 529.
Postcraft
DTP0062 Effects Specialist ..... 115.
QMS
UTI0169 UltraScript ..... 119.
Tactic Software
FON0265 ArtFonts ..... 49.
TeleTypesetting
FDN0343 T-Script ..... 92.
FON0357 T-Script Basic ..... 55.

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3G Graphics
GRA0188 Images with Impact! Accents & Bords.1 . 65.
GRA0111 Images with Impact! Business 1 ..... 65.
GRA0257 Images with Impact! People 1 ..... 95.
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Adobe Systems, Inc.
DTP0054 Illustrator 3.0 (w/ ATM 2.0) ..... 379.
GRA0125 Streamline 2.0 ..... 129.
GRA0191 PhotoShop ..... Call.
Aldus
GRA0264 Freehand 3.0 ..... 399.
Baseline Publishing
GRA0242 Color MacCHEESE ..... 59.
GRA0239 Master Color ..... 99.
GRA0238 Master Paint ..... 50.

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Postscript Language-compatible laser printer, the LaserScript LX produces text and graphics of uncompromising quality and speed. Uses the Microsoft-Bauer PostScript language interpreter for complete PostScript compatibility, and Type 1 and Type 3 font support. With 2.5 megabytes of memory, expandable to 4.5MB, printing large files is easier and faster. Features an advanced design with four active serial ports - Appletalk, Centronic parallel and two RS-232 serial - that switch automatically to provide a broad selection of interfaces for multiple work groups and computer types. **INP 0164 $1759.**

Bright Star Tech, Inc.
GRA0161 interFACE ..... 249.
Claris
CAD0029 ClarisCAD 2.0 ..... 645.
GRA0118 MacDraw II ..... 289.
GRA0117 MacPaint 2.0 ..... 90.
Creative Software
GRA0240 Easy Color Paint 2.0 ..... 47.
Deneba Software
GRA0075 Canvas 2.1 ..... 189.
GRA0187 UltraPaint ..... 125.
Dream Maker
GRA0105 Cliptures Vol 1 Business Images ..... 69.
GRA0124 Cliptures Vol 2 Business Images ..... 69.
GRA0219 Cliptures Vol 3 Sports ..... 69.

Bookends 1.2 (Sensible Software)
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GRA0101 MacGallery (Hypercard version) ..... 27.
GRA0102 MacGallery (MacPaint version) ..... 27.
Electronic Arts
GRA0106 Studio/8 ..... 189.
GRA0231 Studio/32 ..... 449.
Farallon™ Computing
GRA0221 MediaTracks™ ..... 189.
GRA0222 MediaTracks™Multimedia Pack ..... 319.
Graphsoft
CAD0024 Blueprint ..... 219.
CAD0030 MiniCAD+ 3.0 ..... 595.
Innovative Data Design
CAD0039 MacDraft 2.1 ..... 279.
GRA0104 Dreams 1.1 ..... 429.
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GRA0140 MacroMind Director 2.0 ..... 629.
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GRA0169 Newsletter Maker ..... 85.
Paracomp
GRA0235 FilmMaker ..... 435.
GRA0233 Swivel 3D Professional ..... 435.
GRA0234 SwivelArt ..... 81.
Praxitel
UTI0211 Read My Lips ..... 75.
Silicon Beach
GRA0092 Digital Darkroom 2.0 ..... 259.
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HYP0027 SuperCard 1.5 ..... 199.

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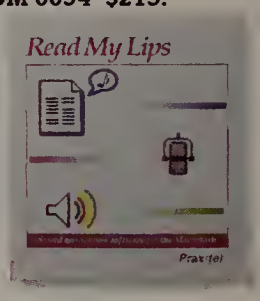
Ideal for international telecommunications. Praised for its ease of use and advanced scripting language, Microphone II 4.0 now contains faster script execution, screen speed, file tranfers and new interface design tools. Supports ZMODEM transfer protocol and can operate modems at any speed from 50 to 57,600 baud. **COM 0094 $215.**



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Flash (Beagle Brothers)
Want to get your files across the network in a flash? Beagle Brother's Flash is a fun file transfer utility for anyone on an AppleTalk network. Forget dedicated file servers - Flash moves across your network quickly, easily, and reliably. Flash is simple to use - just drop files into folders. And because it works in the background, you can work while Flash transfers your files. You can even chat with other users in real time! **NET 0060 $129.**

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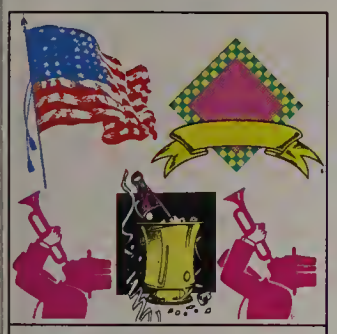

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Communicate more effectively with fabulous art and graphics from the world's largest publisher of clip art. Each of the 18 ImageBase packages contains at least 100 topic-related images drawn by professional artists. **GRA 0169 $85.**

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Search and replace by font, size, and style across all active windows. Complete page formatting including multiple columns along a WYSIWYG page view. Graphics capabilities and drawing tools add visuals to WP presentations. Includes 10 editable clipboards, glossary indexing, table of contents generator, spell checker and a thesaurus. **WRD 0029 $245.**

GRA0112 SuperPaint 2.0 ..... 135.
Solutions, Inc.
DAC0002 SmartScrap & The Clipper 2.01 ..... 56.
Strata
GRA0176 StrataVision 3D 2.0 ..... 349.
Strategic Mapping, Inc.
GRA0227 Atlas MapMaker 4.5 ..... 369.
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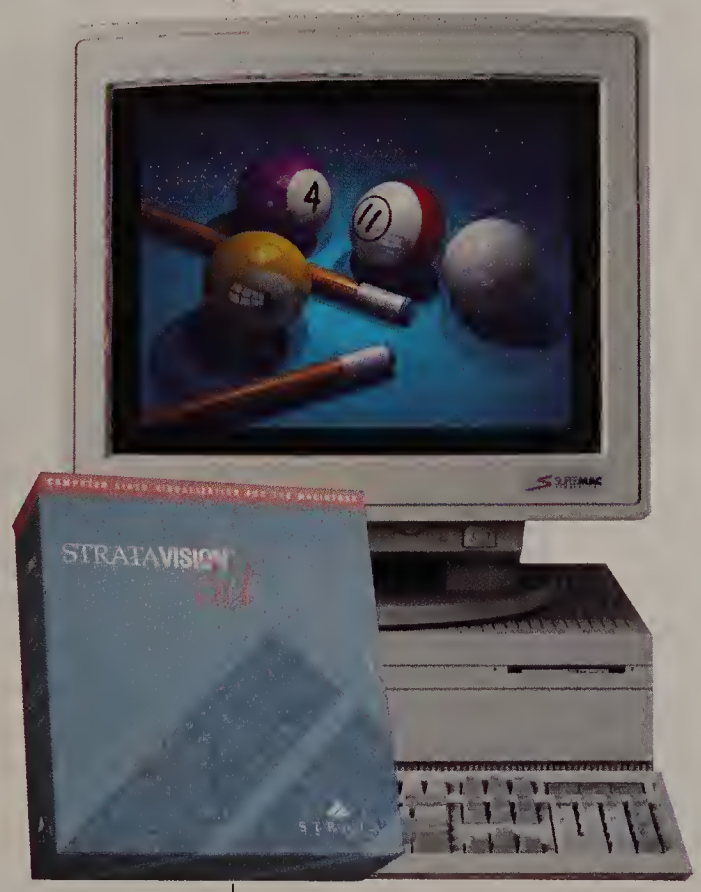

GRA0039 ClickArt Business Image ..... 32.
GRA0088 ClickArt EPS Illustrations ..... 82.
Zedcor
GRA0199 DeskPaint 3.3 ..... 115.

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INP0162 TrueLaser Printer ..... 2019.
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MOD0053 Dove Fax Plus ..... 359.
Global Village
MOD0049 TelePort 2400 ADB Modem ..... 145.
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Supra Corporation
MOD0020 SupraModem 2400 ..... 119.

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UTI0214 Symantec Antivirus for Mac 3.0 (SAM) .. 65.

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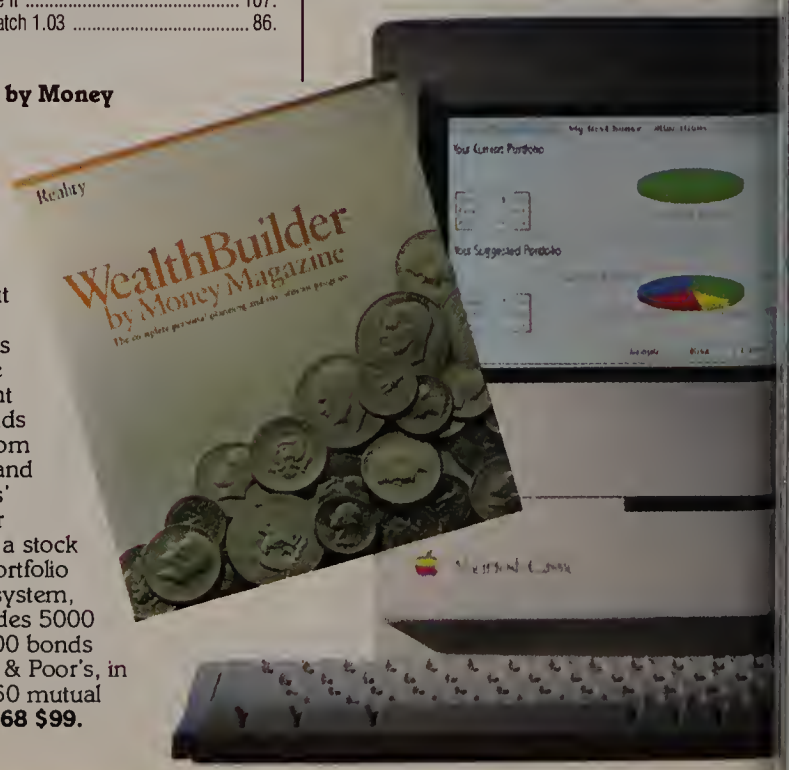

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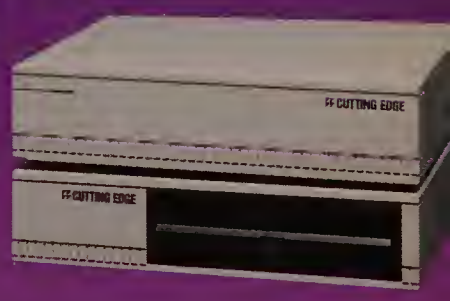

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KEEPING CURRENT

Keep your Mac up-to-date with the

AH, TECHNOLOGY—HOW IT MARCHES. Should all the talk about new Macintoshes and System 7.0 leave you feeling slightly trod upon, don't despair. No matter which Mac you own, there are upgrade options available that let you move to a higher class of performance. ■ Deciding to upgrade is easy; figuring out how to upgrade isn't. If anything, that process is even more complicated now, thanks to Apple's introduction of the Mac Classic, LC, and IIsi. Not only can you choose from traditional approaches to upgrading—system upgrades, memory, and accelerators—but you also must consider if the best upgrade might be just to buy another Mac. To give you a better idea of the options, I'll discuss three types of upgrades for Macs from the Plus up: system upgrades, memory upgrades, and accelerators. ■ **SYSTEM-WISE** A system upgrade gives a Mac new capabilities—whether the upgrade be a floppy drive, a SCSI port, color support, or a logic board. And depending on the features offered, system upgrades range widely in price and complexity. The most important thing

by Brita Meng

PAUL FRANZMOORE

latest in upgrades

to do before buying a system upgrade is to make sure that your Mac can support the features the upgrade offers.

Quite often, compatibility depends on whether the Mac has the appropriate read-only memory (ROM) chips for the upgrade. Sitting there on a Mac logic board, ROM chips look pretty nondescript. But don't be fooled—they contain information necessary for a Mac to function.

Different Macs use different ROMs. For example, all Mac ROMs include QuickDraw—the routines a Mac uses to display information on screen. But only Mac LC, IIsi, IIci, and IIfx ROMs have 32-bit Color QuickDraw built in. To make things even more confusing, even if different Macs have the same size ROMs, it doesn't mean the ROMs are identical. And sometimes the same Mac model can even have two different versions of ROMs. (The first Mac II ROMs had problems recognizing add-in memory boards.)

ROMs also determine what kind of floppy drive you can install in a Mac, and whether the Mac can access a SCSI device. To use an 800K floppy drive or an external hard drive, a Mac must have at least 128K ROMs (the Mac Plus ROMs). Similarly, the ROMs in the Plus, II, and some SEs don't support an internal SuperDrive.

Mac SE and II owners can upgrade to a SuperDrive by purchasing an FDHD upgrade kit from Apple. The kit includes an internal SuperDrive as well as the ROMs required to recognize it. If you own a Plus, or if you want an external drive for your SE or II, you can opt for a floppy drive from PLI or Kennect Technology. Both companies offer external high-capacity 1.4MB floppy drives with capabilities similar to those of the SuperDrive.

ROMs can also limit the type and amount of RAM a Mac can use to run applications. Because some ROMs run only in *24-bit mode*, they can't take advantage of all the RAM that you can install in a 32-bit, 68030-based Mac. In addition, the ROMs in a Mac determine whether you can take advantage of System 7's virtual memory feature (see "Coping with Virtual Memory").

Logically Speaking

If you want to upgrade more than just a floppy drive, you should consider an Apple logic board upgrade. With Apple's logic board upgrades, you swap the current main logic board in a Mac for a totally new one, thus giving the Mac a complete personality change. Four Macs can take advantage of these upgrades—the SE, the IIcx, the II, and the IIx.

Apple's Macintosh SE/30 Logic Board Upgrade ($1699) replaces the main logic board of

ABOUT YOUR MAC

	Plus	SE	Classic	SE/30
Processor	8MHz 68000	8MHz 68000	8MHz 68000	16MHz 68030
Math coprocessor	○	○	○	●
Memory management unit	○	○	○	● [2]
ROM capacity/expandable	128K/○	256K/○	512K/○	256K/●
ROM SCSI support	●	●	●	●
ROM QuickDraw	b & w	b & w	b & w	color
ROM 32-bit memory addressing	○	○	○	○
Built-in video support	b & w	b & w	b & w	b & w
Floppy drive	800K	SuperDrive [4]	SuperDrive	SuperDrive
Expansion slots	none	one SE direct slot	none	one 030 direct slot

● = *yes;* ○ = *no.* [1] *Available with expansion board.* [2] *Included with 68030 CPU.*

COPING WITH VIRTUAL MEMORY

Virtual memory allows the Mac to treat part of a hard drive as RAM. Previously, it was thought that all you needed to take advantage of the virtual memory in System 7 was either a 68020 microprocessor and 68851 Paged Memory Management Unit (PMMU), or a 68030 microprocessor. But that's not necessarily so. Because of Apple's implementation, System 7 requires firmware routines that are not present in the ROMs of 68000-based machines and cannot be added with a software patch. As a result, Mac Plus, SE, Classic, and Portable computers that have been upgraded with 68030 accelerator boards can run System 7, but can't use virtual memory. It's possible that some accelerators could be modified to run virtual memory, but that's the responsibility of the board vendor, not Apple.

Connectix Corporation, developer of the Virtual utility, says it will update Virtual for compatibility with System 7. Until then, however, if you own a 68000-based Mac, and you must have virtual memory, you're better off sticking to System 6 and running Virtual.

If your Mac supports virtual memory, and you intend to use it, plan to have at least 4MB of RAM. Although System 7 runs on 2MB systems, using virtual memory on a 2MB system degrades performance significantly. The Mac must go to the hard drive—a process called *paging*—to retrieve information that's typically in RAM. Because a hard drive has a slower access time than RAM does, paging isn't efficient and it reduces performance.

LC	II	IIx	IIcx	IIsi	IIci	IIfx	Portable
16MHz 68020	16MHz 68020	16MHz 68030	16MHz 68030	20MHz 68030	25MHz 68030	40MHz 68030	16MHz 68000
○	●	●	●	optional [1]	●	●	○
○	optional [3]	● [2]	● [2]	● [2]	● [2]	● [2]	○
512K/●	256K/○	256K/●	256K/●	512K/●	512K/●	512K/●	256K/●
●	●	●	●	●	●	●	●
32-bit color	color	color	color	32-bit color	32-bit color	32-bit color	b & w
●	○	○	○	●	●	●	○
color	none	none	none	color	color	none	b & w
SuperDrive	800K	SuperDrive	SuperDrive	SuperDrive	SuperDrive	SuperDrive	SuperDrive
one 020 direct slot	six NuBus slots	six NuBus slots	three NuBus slots	one NuBus or one 030 direct slot[5]	three NuBus slots	six NuBus slots	one Portable direct slot; one modem

[3] Socket included for 68851 PMMU. [4] SEs built before 9/89 have 800K internal floppy drive. [5] Requires expansion board.

an SE with that of an SE/30. If you have an SE with a SuperDrive (that includes those that have been upgraded with a Macintosh SE FDHD Upgrade Kit), you end up with the exact equivalent of a stock SE/30.

The Macintosh IIci Logic Board Upgrade turns a Mac IIcx into a Mac IIci. With the IIci, you get on-board video, a faster CPU, a cache board connection, and ROMs that include Color QuickDraw and support for 32-bit memory addressing. But at $2399, the upgrade isn't cheap; you should consider it only if you need 32-bit addressing or speed. If you opt for this upgrade, hang on to your now-spare video board: a NuBus add-in video board performs faster than the IIci's on-board video.

At $2999, Apple's Macintosh IIfx Logic Board Upgrade for the Mac II and IIx is the best value. Install it and you end up with a top-of-the-line Mac. If you want a true IIfx, you also need to upgrade the II's 800K floppy drive with Apple's Macintosh II FDHD Upgrade Kit.

The advantage of an Apple logic board upgrade is that you get a true Mac. But there are disadvantages, too. First, Apple upgrades only exist for specific Mac models. Second, there may be hidden costs; for example, if you upgrade an SE to an SE/30 and want to add an expansion board, you have to buy an SE/30 adapter because the SE's expansion slot differs from the SE/30's. And third, Apple-label upgrades are expensive. Don't opt for an Apple upgrade without checking out third-party accelerators and CPU upgrades. You may find that such upgrades offer performance improvements identical to or even better than the improvements you'll get from Apple upgrades.

Apple's Macintosh IIfx Logic Board Upgrade for the Mac II and IIx is the best value

Coprocessor Considerations

Depending on the Mac, you may be able to improve or enhance its performance by adding a coprocessor. Floating-point units (FPUs) such as the 68881 and 68882 are coprocessors specially designed to speed math calculations. The 68882, which comes standard with the Mac IIx, IIcx, IIci, IIfx, and SE/30 is software- and hardware-compatible with the 68881 that shipped with the original Mac II. However, the 68882 is one and a half to two times faster than the 68881.

If you have a Mac II, you might consider upgrading the 68881 to gain performance. Just swap the 68881 on the Mac II logic board for the 68882. Neither the IIsi nor the Mac LC offers a coprocessor socket on the main logic board. You can add a coprocessor to the IIsi either by installing an accelerator or by installing an adapter board such as Apple's Macintosh IIsi 030 Direct Slot Adapter Card. That board provides not only a connector for an 030 Direct Slot add-in board but also a 68882 FPU. PSI Integration's Bus Adapter Card for the IIsi offers an FPU socket and a cache board slot. LC owners can take advantage of accelerators or third-party boards to add FPUs too. Ethernet add-in boards from Dayna Communications and Asante Technologies include FPU sockets. MacProducts also sells a 16MHz 68882 FPU specially designed to fit in the LC.

The 68851 Paged Memory Management Unit (PMMU) is another type of coprocessor. When the PMMU is installed, a 68020-based Mac—like the Mac II—can take advantage of virtual memory. The Mac II logic board has an

empty socket where you plug in the 68851. The LC, which is also 68020-based, has no such socket.

Macs based on the 68030 do not require a separate PMMU because the 68851 circuitry is built into the 68030. And if you're lucky enough to get your hands on a 68040-based accelerator, you don't even need to worry about the FPU. The 68040 has both 68851 PMMU and 68882 FPU circuitry built in.

Of Accelerators and Speed

A Mac that needs an overall performance boost is the perfect candidate for an accelerator or CPU upgrade. Most accelerators work with the Plus, SE, II, and IIx. Because the accelerators clip on the CPU socket on the Mac's main logic board, you should make sure that the accelerator is securely installed. Should it become unseated, it may short out the main logic board. Environmental conditions—high internal temperatures, humidity, and pollution—can also cause corrosion in the contacts between the clip-on upgrade and the CPU. To prevent problems, you should have a dealer solder the upgrade to the CPU. It's not pretty and it's permanent, but at least the accelerator won't come loose.

Processors currently available on accelerators range from a 16MHz 68000 to a 25MHz 68040. A 68040-based accelerator offers better performance, but it's also much more expensive. For example, Brainstorm Products' Brainstorm Accelerator—which uses a 16MHz 68000—costs $249. The 68040-based accelerators range around $3000.

Whenever you buy an accelerator, you should ask about compatibility with other Mac enhancements. This is especially important in Macs where space is at a premium—the Plus, SE, and Classic. Also keep in mind that accelerators that use the same CPU don't necessarily offer identical performance gains. Besides processor speed, other factors that affect performance include the presence of on-board memory or cache memory. For more information on 68030 accelerators, see "The Accelerated Course," in this issue.

Another way to squeeze performance from a Mac without squeezing your wallet is to add a cache board. According to our tests, a cache board for the IIci can improve performance by 27 percent (see "The Accelerated Course"). Most cache boards work with the IIci, which has a specially designed slot for them. However, Dove Computer's MaraThon Racer and Orchid Technology's MacSprint II work on the II. Even IIsi owners can get into the act with PSI Integration's Bus Adapter Card, which has a cache board option.

MEMORY CONFIGURATIONS

Macintosh Model	Maximum RAM You Can Install	Minimum Required Speed for RAM (in ns)	Possible SIMM Combinations	Total Amount of RAM You Get
Plus, SE	4MB	150	two 256K SIMMs	512K
			four 256K SIMMs	1MB
			two 1MB SIMMs	2MB
			two 1MB SIMMs + two 256K SIMMs	2.5MB
			four 1MB SIMMs	4MB
Classic	4MB	150	1MB fixed	1MB
			1MB fixed + 1MB exp. board	2MB
			1MB fixed + 1MB exp. board + two 256K SIMMs	2.5MB
			1MB fixed + 1MB exp. board + two 1MB SIMMs	4MB
LC	10MB	100	2MB fixed	2MB
			2MB fixed + two 1MB SIMMs	4MB
			2MB fixed + two 2MB SIMMs	6MB
			2MB fixed + two 4MB SIMMs	10MB
SE/30, II, IIx, IIcx	8MB	120	four 256K SIMMs	1MB
			eight 256K SIMMs	2MB
			four 1MB SIMMs	4MB
			four 1MB SIMMs + four 256K SIMMs	5MB
			eight 1MB SIMMs	8MB
			four 4MB SIMMs	16MB
			four 4MB SIMMs + four 256K SIMMs	17MB
			four 4MB SIMMs + four 1MB SIMMs	20MB
			eight 4MB SIMMs	32MB
IIsi	17MB	100	1MB fixed + four 256K SIMMs	2MB
			1MB fixed + four 512K SIMMs	3MB
			1MB fixed + four 1MB SIMMs	5MB
			1MB fixed + four 2MB SIMMs	9MB
			1MB fixed + four 4MB SIMMs	17MB
IIci	32MB	80	four 256K SIMMs	1MB
			eight 256K SIMMs	2MB
			four 1MB SIMMs	4MB
			four 1MB SIMMs + four 256K SIMMs	5MB
			eight 1MB SIMMs	8MB
			four 2MB SIMMs + four 256K SIMMs	9MB
			four 2MB SIMMs + four 512K SIMMs	10MB
			four 2MB SIMMs + four 1MB SIMMs	12MB
			four 4MB SIMMs	16MB
			four 4MB SIMMs + four 256K SIMMs	17MB
			four 4MB SIMMs + four 512K SIMMs	18MB
			four 4MB SIMMs + four 1MB SIMMs	20MB
			four 4MB SIMMs + four 2MB SIMMs	24MB
			eight 4MB SIMMs	32MB
IIfx	128MB	80	four 1MB SIMMs	4MB
			eight 1MB SIMMs	8MB
			four 4MB SIMMs	16MB
			four 4MB SIMMs + four 1MB SIMMs	20MB
			eight 4MB SIMMs	32MB

SIMMple Pleasures

A memory upgrade is the cheapest way to enhance Mac performance, especially if you're tired of getting dialog boxes saying "Out of Memory" or "Application Unexpectedly Quit." As always, the upgrade options available depend on the Mac you own. In addition, the upgrade you buy may affect your upgrade options in the future.

Most Macs use what's called a Single In-line Memory Module, or SIMM, for memory expansion. A SIMM is actually a small circuit board with dynamic random-access memory (DRAM) chips soldered to it. The exceptions are the Mac 128K, 512K, and 512KE, which have memory chips soldered to the main logic board, and the Mac Portable, which requires special low-power memory called static random-access memory (SRAM). The Classic, LC, and IIsi have memory soldered to the main logic board, but you still use SIMMs to add memory.

The type of chips on a SIMM determines SIMM capacity. There are 256-kilobit chips on a 256K SIMM, 1-megabit chips on a 1MB SIMM, and so on. Currently, five types of SIMMs are available—256K, 1MB, 2MB, 4MB, and 16MB.

You may see a SIMM's size expressed as a particular capacity followed by an *x* and a number. That number indicates how many chips there are on the SIMM module. For example, "1MB × 8" means there are eight 1Mbit chips on the SIMM. Other SIMMs may have only two RAM chips. If you spot these SIMMs, don't panic. The Mac accesses RAM data 8 bits at a time, or in *bytes*. Because each of those RAM chips contains 4 bits of each byte, instead of just 1 bit, only 2 chips are necessary. The bottom line is that you shouldn't worry about how many chips are on a SIMM.

You may have also heard about *parity* SIMMs. Common in the IBM PC market, parity SIMMs contain an extra parity chip for error checking and correction. Only the IIci and IIfx have the parity-checking capability to take advantage of such SIMMs. You can use parity SIMMs in other Macs, but because they're more expensive, you might as well buy regular SIMMs.

The speed of the chips also determines how fast the Mac's CPU can retrieve information from memory. The lower the SIMM speed number, the faster the SIMM is. And the faster the CPU is, the faster SIMM it needs. You can usually determine the SIMM speed by looking at the chips on the SIMM. You'll see a part number, a dash, and then more numbers. Multiply the numbers after the dash by 10 to get the speed. For ex-

A memory upgrade is the cheapest way to enhance Macintosh performance

COMPACT MAC UPGRADES

	128K	512K	512KE	Plus	Classic	SE	SE/30
ACCELERATORS							
Brainstorm Products	○	○	○	●	●	●	○
Dove Computer Corporation	○	○	○	●	●	●	●
MacProducts USA	●	●	●	●	●	●	○
Mobius	○	○	○	○	○	●	○
NewLife Computer Corporation	○	●	●	●	○	●	●
Novy Systems	○	○	●	●	○	●	○
Radius	○	○	○	●	○	●	○
Siclone Sales & Engineering Corporation	○	○	○	○	○	●	○
Total Systems	●	●	●	●	●	●	●
FPU UPGRADES							
PNY Electronics	○	○	○	●	●	●	○
Spectral Innovations	○	○	○	○	●	●	●
SCSI PORT UPGRADES							
Brainstorm Products	○	○	●	○	○	○	○
Computer Care	●	●	●	○	○	○	○
Dove Computer Corporation	○	○	●	○	○	○	○
MacProducts USA	○	○	●	○	○	○	○
NewLife Computer Corporation	●	●	●	○	○	○	○
Peripheral Outlet	●	●	●	○	○	○	○
Total Systems	●	●	●	○	○	○	○
SUPERDRIVE UPGRADES							
Apple Computer	○	○	○	○	○	●	○
Kennect Technology	○	○	●	●	●	●	●
Mac Friends	○	○	○	●	●	●	●
PLI	○	○	○	●	●	●	●
UPGRADES TO MAC PLUS EQUIVALENT							
Apple Computer	●[1]	●[1]	●	○	○	○	○
Computer Care	●	●	●	○	○	○	○
MacProducts USA	●	●	●	○	○	○	○
Peripheral Outlet	●	●	●	○	○	○	○

● = yes; ○ = no. [1] Requires Macintosh Plus Disk Drive Kit. Note: The only upgrades available for the Portable are memory and SuperDrives from Apple, Kennect, and PLI.

ample, if an 8 follows the dash, then you've got an 80-nanosecond SIMM.

As long as your SIMMs are equal to or faster than the recommended speed for your Mac, they'll work fine (see "Memory Configurations"). There's no problem with installing SIMMs that are faster than the Mac needs; in fact, most companies currently sell only 100ns and 80ns SIMMs. If you put 80ns SIMMs in a Mac SE, the SE continues to access memory at 150ns, even if the SIMMs can go faster.

SIMMs come in different *profiles,* or heights, due to the type of RAM chip soldered to the module. Low-profile SIMMs use surface-mount chips; the leads of the chip are soldered directly to the board. High-profile SIMMs use Dual In-line Package (DIP) chips; the leads are soldered into holes on the SIMM board.

Make sure to buy low-profile SIMMs. Because of their height, high-profile SIMMs may interfere with future expansion. For example, high-profile SIMMs may block the expansion slot in an SE. In a Mac II or IIx, they may prevent you from adding a full-height hard drive. High-profile SIMMs may also block the air circulation around the main Mac logic board, causing heat problems in Macs without internal fans. (For a complete list of memory vendors, see *Where to Buy,* under Memory Upgrades.)

SIMM Tips

Although all Macs can accommodate 1MB SIMMs, whether you can use other SIMM sizes depends on your Mac. Only the LC and IIsi can use the newer 2MB SIMMs. The smallest SIMM that can be used in a IIfx is a 1MB SIMM. And you cannot use 4MB SIMMs in a Plus, SE, or Classic (for more information on SIMM configurations see "Memory Configurations").

Getting the Mac II and IIx to use 4MB SIMMs is a bit complicated. The original Mac II ROMs cannot recognize 4MB SIMMs; if you install them, the Mac crashes during start-up. The solution to this problem is to upgrade the ROMs using Apple's Macintosh II FDHD Upgrade Kit. But that's not all: for 4MB SIMMs to work in a IIx and an upgraded II, an extra programmable array logic (PAL) chip is necessary on each SIMM board. So before you buy 4MB SIMMs for a II or IIx, make sure to ask the memory vendor if the SIMMs are compatible.

With a Plus, SE, or LC, you must upgrade SIMMs two at a time. That's because the CPUs in those machines have a *16-bit data path;* in other words, they access memory 16 bits at a time. (Remember, each SIMM provides only 8 bits, or 1 byte, of data.) All the other Macs—except the Classic—require that you upgrade SIMMs four at a time, because they have a 32-bit data path. The Classic has no SIMM sockets on its main logic board; you add memory with a special memory-expansion board.

One way to reuse old SIMMs is with a memory-carrier board. These boards, available from vendors such as Computer Care and Siclone Sales & Engineering, have their own SIMM sockets—much like the Classic memory-expansion boards. Put, say, four 256K SIMMs into the carrier board, then plug the carrier board into a SIMM socket in the Mac. The Mac then sees the carrier board as a 1MB SIMM. Because a carrier board is physically larger than a normal SIMM, however, you should make sure before buying one that it won't interfere with an internal hard drive or add-in boards.

If installing SIMMs was all you needed to do in order to use gobs of memory in a Mac, that would be great. But alas, it's not so. Technically, all 68030-based Macs and the Mac LC should be able to see 128MB of RAM with 16MB SIMMs installed. (The design of the Plus, SE, and Classic restricts these machines to no more than 4MB; the Portable tops out at 9MB.) But if you're running System 6.0.X, those Macs can generally only use a maximum 8MB of physical SIMM memory.

FOR 128K, 512K, AND 512KE MAC OWNERS

No doubt about it, Mac 128K, 512K, and 512KE computers are the most affected by Apple's introduction of the Mac Classic, LC, and IIsi. Before, the best strategy for upgrading a compact Mac was to turn it into a Mac Plus, via either Apple's Macintosh Plus Logic Board Upgrade or an equivalent third-party upgrade. Nowadays, however, such upgrades may cost more than buying a new Mac.

For instance, to bring a Mac 512K up to Plus level using Apple's upgrade path, you spend nearly $900. Upgrading a Mac 128K costs a whopping $1098—that's more than the price of a Mac Classic. The outlook is brighter for 512KE Macs because those computers already have 128K ROMs. As a result, they cost less to upgrade to Plus levels.

If you can't bear to part with your compact Mac—or can't afford to—your best option is to buy a third-party upgrade from companies such as Computer Care, MacProducts USA, Peripheral Outlet, or Total Systems (see "Compact Mac Upgrades"). Such upgrades either bring the Mac to Plus levels for less or provide functionality beyond the Plus. For example, Peripheral Outlet offers a 128K-to-Plus equivalent for $695 and a 512K-to-Plus equivalent for $625. Computer Care's MacRescue Video board provides six SIMM sockets, a SCSI port, and a large-screen video interface for a 512KE. And the Gemini series of upgrades from Total Systems allows you to upgrade the CPU in those Macs to a 68030, same as in the SE/30 and IIci.

There are three ways to rid the Mac of that 8MB cap. The first is to use System 7, a 32-bit operating system. However, to take advantage of System 7's 32-bit capabilities, the Mac must also have 32-bit ROMs. Macs that satisfy this requirement—and can thus use System 7's 32-bit addressing option—include the IIci, IIfx, LC, and IIsi. Although the SE/30, II, IIx, and IIcx have 32-bit processors, their ROMs do not support 32-bit addressing. The ROMs in the Plus, Classic, SE, and Portable are a moot point, since those Macs are limited by 68000 CPUs.

The second and third options don't require a system software upgrade, but do require some hardware. If you have a Mac SE/30, II (with 68851 PMMU), IIx, IIcx, or IIci, you can use Connectix's Maxima software utility to rid them of the 8MB limit. Maxima—which runs under System 6.0.X—allows the Mac to recognize up to 14MB of RAM. Any other physical RAM beyond that becomes a RAM disk (a portion of memory that acts like a hard drive).

Two other utilities from Connectix, Optima/32 and Optima/128, allow owners of Macs with 32-bit clean ROMs to take advantage of even more memory under System 6.0.X. On Macs with enough physical memory, Optima/32 creates up to 32MB of application memory; Optima/128 allows you to use up to 128MB of RAM for running applications. Beware, however: the applications you run under Optima must—like the ROMs—be 32-bit clean.

Think Long Term

An upgrade is a long-term investment in a Mac. And you should take the same care in buying any upgrade that you did when you bought the Mac. Don't buy strictly on price—especially as far as SIMMs are concerned. Talk to other users to find out more about products. Check the vendor's reputation, support, and warranty.

Once you decide on an upgrade, there are installation issues to consider. Be aware that installing any upgrade yourself voids the Apple warranty. In addition, installing some upgrades yourself may void their warranties. So despite people telling you that installation is a piece of cake, if you're slightly nervous or unsure, don't do it yourself. Most upgrade vendors can give you names of dealers or certified installers in your area; often, the vendors will install the upgrade for a small fee.

Don't buy an upgrade strictly on price—especially as far as SIMMs are concerned

No Mac is a dead end. With the right upgrade, you'll be better able to keep pace with the march of technology. ■

See *Where to Buy,* under Upgrades, for contact information.

MODULAR MAC UPGRADES

	LC	II	IIx	IIcx	IIsi	IIci	IIfx
ACCELERATORS							
Computer System Associates	○	●	○	○	○	○	○
DayStar Digital	○	●	●	●	○	●	○
Dove Computer Corporation	○	●	●	○	○	○	○
Fusion Data Systems	●	○	○	○	○	○	○
Radius	○	●	●	●	○	●	●
Siclone Sales & Engineering Corporation	○	●	●	○	○	○	○
Sigma Designs	○	○	○	○	●	●	○
Total Systems	●	●	●	○	●	○	○
CACHE BOARDS							
Applied Engineering	○	○	○	○	●	●	○
Apple Computer	○	○	○	○	○	●	○
ATTD Technology	○	○	○	○	●	●	○
DayStar Digital	○	○	○	○	○	●	○
IIR	○	○	○	○	●	●	○
Micron Technology	○	○	○	○	○	●	○
Orchid Technology	○	●	○	○	○	○	○
PSI Integration	○	○	○	○	●	○	○
Total Systems	○	○	○	○	○	●	○
UR Micro	○	○	○	○	○	●	○
FPU UPGRADES							
Apple Computer	○	○	○	○	●	○	○
Computer System Associates	○	●	●	○	○	○	○
MacProducts USA	●	○	○	○	○	○	○
Novy Systems	●	○	○	○	○	○	○
PSI Integration	○	○	○	○	●	○	○
Shadow Technologies	○	●	●	○	○	○	○
Spectral Innovations	○	●	●	●	○	●	●
System Technology	●	○	○	○	○	○	○
Tercom Corporation	○	●	○	○	○	○	○
LOGIC BOARD UPGRADES							
Apple Computer	○	●	●	●	○	○	○
PMMU UPGRADES							
PNY Electronics	○	●	○	○	○	○	○
Tercom Corporation	○	●	○	○	○	○	○
Third Wave Computing	○	●	○	○	○	○	○
SUPERDRIVE UPGRADES							
Apple Computer	○	●	○	○	○	○	○
Kennect Technology	●	●	●	●	●	●	●
PLI	●	●	●	●	●	●	●

● = *yes;* ○ = *no.*

These recommended drives offer great performance and value. From top to bottom: Storage Dimensions MacinStor 1020-SI, GCC UltraDrive 430S, FWB hammer1000, Liberty Systems Stealth 425Q, and MicroNet SB-303NP.

THE HIGH & THE MIGHTY

MACWORLD LAB TESTS 66 LARGE-CAPACITY HARD DRIVES TO HELP YOU CHOOSE THE RIGHT ONE

Like the good Boy Scout I never was, I believe in planning ahead and being prepared. Thus, about two years ago, I purchased a 300MB hard drive, despite the fact that my files could little more than half fill an 80MB drive at the time. For quite a while, files and folders floated effortlessly within a universe of empty disk space; I smiled each time I saw the "250,000K available" message in the corner of the disk drive window. ▪ Today, of course, I no longer have the same smug smile on my face. My hard drive is nearly full; the time has come to purchase another high-capacity hard drive. But my, how times have changed. Two years ago, there were only a handful of drives to choose from, drives in excess of 300MB were especially rare, almost all large-capacity drives were big and clunky, and prices were, well, up there. Today, however, you can pick from more than 100 hard drives ranging from 300MB to over 2 gigabytes. Some are almost as small as a Walkman tape player. And prices, though still considerable, are not nearly so painful. ▪ To help you choose from such an embarrassment of riches, we review high-capacity external hard drives 300MB and larger on the following pages. Macworld Lab analyzed 66 such hard drives for speed and noise, while I looked at a number of other important fea-

BY ROBERT C. ECKHARDT

ROBIN GINSBERG

tures for these and other qualifying drives. Apart from the ever-increasing number of drives and their still-decreasing prices, the highlights of this year's roundup include better Macintosh compatibility and a record-low failure rate (only 1 percent of drives received were dead on arrival, compared with 4 percent last year). We identified a number of favorites, too, but I'm getting ahead of myself.

Shop Talk

Generally speaking, I prefer to think of a piece of electronic equipment as a black box—what matters is whether it performs as it is supposed to. But because the company you purchase a drive from does not make the drive mechanism itself, and because the drive mechanism is the single most important part of the package, hard drives are an important exception to my black box rule.

A hard drive is nothing more than a drive mechanism and a bunch of other, largely lesser stuff. The drive mechanism comprises two parts: a stack of spinning platters with a series of nervous read-write heads sandwiched in between, all sealed in a metal box; and a circuit board specially designed to transfer data between the read-write heads and the drive's SCSI port. The hard drive vendor surrounds the mechanism with a power supply, perhaps a fan, a few dials and switches, some wires, one or two blinking lights, and a box with a pair of SCSI connectors. Not surprisingly, then, it is the mechanism that by and large determines a drive's most important characteristics—capacity and speed—although the software supplied by the vendor can affect both of these attributes to a degree.

ROBIN GINSBERG

Recommended 600MB drives include the MacProducts USA MagicDrive 600, the Ehman 660MB F/H Wren Runner, the PLI PL635 Turbo, and the HDI PowerDrive 600I.

The 25 vendors whose drives we tested purchase their mechanisms from 8 sources: Fujitsu, Hitachi, Hewlett-Packard, Maxtor, Micropolis, Quantum, Seagate, and Western Digital (which, in turn, buys some of its drive mechanisms from IBM). By far the most popular source is Seagate; about 75 percent of all high-capacity drives contain Seagate mechanisms. Most vendors use only one mechanism for a given hard drive model; a few, such as Microtech International and Rodime Systems, may use different drive mechanisms at different times. The mechanisms used in the drives we tested are listed in both hard drive speed tests.

As for drives other than the ones we tested, occasionally the name Imprimis (a subdivision of Control Data Corporation purchased by Seagate in 1989) or Wren (one of Seagate's several product lines) appears in a hard drive's model name, indicating that the mechanism inside is from Seagate. Model name suffixes such as I (for Imprimis) and WD (for Western Digital) occasionally appear as well. Otherwise, overt clues to a drive mechanism's make and model are rare. Most hard drive vendors will tell you if you ask, however (or you can use the utility SCSI Evaluator, as we did); of the vendors that submitted drives for testing, for example, only Optima refused to disclose the sources of its drive mechanisms.

Is Bigger Really Better?

The first consideration in any hard drive purchase is capacity. A good rule of thumb is to buy a drive large enough to fulfill your needs for the next year or two. Don't go hog-wild and buy the largest drive available (unless you really need the capacity), thinking it will last until you retire. Hard drives do wear out, and more important, the additional capacity you'll need in two years' time should be much less expensive then than it is now.

If you're a mere mortal who has outgrown a 40MB or 80MB hard drive faster than expected, you should find drives in either the 330MB or 410MB ranges more than adequate. Graphic artists, desktop publishers, multimedia types, and others who work with large numbers of large files will probably be more comfortable with drives in at least the 600MB range. If you're a network manager, you should probably consider drives with 660MB and above.

Although it's common practice to infer a drive's capacity from its model number, this is not an accurate way to size up a drive. True, the model number and the formatted capacity are often close, and in many instances the difference between the two is a matter of only a few percent. Sometimes the discrepancy is in your favor, as with the La Cie ZFP+ 640MB, which formats to 645.7MB; sometimes it's not, as with the La Cie ZFP+ 600MB, which formats to 584.7MB. Occasionally, however, the formatted capacity is significantly different from what you would expect. DJK Development's MS-410, for example, formats to 345.8MB.

Hard Drive Speed Tests 1GB and Up

Color Key

- Fastest
- Percent slower than fastest
  - Up to10%
  - 11%–20%
  - 21%–29%
  - 30% or more

Mechanism Key

F=Fujitsu M2266S
H=HP 97549T100
M1=Micropolis
M2=Micropolis 1598
S1=Seagate ST41200
S2=Seagate ST41600
S3=Seagate ST4767

	Overall		Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Compile (in seconds)	SCSI Evaluator Read (in kbps)	SCSI Evaluator Write (in kbps)
Overall Fastest	1.00	MicroNet SB-1300NP (S2)	61.3	61.3	27.8	44.6	66.7	19,909	16,975
	0.95	MicroNet SBT-1288NP (S3)	64.8	63.1	29.4	45.6	70.8	18,333	16,447
	0.87	MacDirect Fujitsu 1.2GB (F)	57.6	64.7	32.8	47.1	70.1	12,992	10,480
	0.86	FWB hammer1000 (S1)	50.9	68.2	40.4	51.4	80.4	14,425	11,633
	0.86	Optima Concorde 1050 (S1)	57.9	67.9	40.7	51.8	82.4	16,456	12,581
	0.84	La Cie ZFP+ 1.2G (S1)	57.1	68.1	40.8	51.8	82.4	14,552	12,565
	0.84	Storage Dimensions MacinStor 1020-S1 (S1)	57.8	68.1	40.4	51.7	83.0	14,386	12,435
	0.83	HDI PowerDrive 1050MC (M1)	60.6	65.8	39.4	47.6	79.3	13,312	10,617
	0.83	MacLand Imprimis 1.2G (S1)	57.6	68.5	40.5	51.8	81.7	14,234	11,445
	0.82	Cranel 1G (H)	71.3	67.3	35.7	47.1	74.0	12,776	9,823
	0.82	HDI PowerDrive 1050I (S1)	58.2	66.3	44.7	51.6	83.3	14,650	11,613
	0.81	Rodime Cobra 1000e (S1)	59.2	69.8	40.6	52.0	83.6	13,336	10,830
	0.80	CMS Enhancements Platinum 1000 (S1)	60.3	68.8	39.2	51.7	82.2	13,199	9,959
	0.80	Procom MTD1000 (S1)	60.3	69.2	39.6	51.6	81.5	13,183	9,926
	0.80	Relax Hard Plus 1.0 Gig - Wren (S1)	62.4	69.7	42.1	52.9	82.5	13,362	10,846
	0.79	PLI PL1.2GIG Turbo (S1)	61.5	72.5	41.5	50.2	79.5	13,201	9,855
Overall Slowest	0.77	Microtech N1000 (M2)	62.9	68.4	43.8	51.1	82.2	12,382	8,986

To determine ranking, we indexed overall performance numbers against the fastest drive, the MicroNet SB-1300NP.

SCSI—The Harder Part of Hardware

All large-capacity drives for the Macintosh are SCSI devices, which attach—via a (usually very short) SCSI cable supplied with the drive—to the Mac's SCSI connector. The SCSI connectors on the drives themselves (there are two, so you can create a chain of SCSI devices) are either 25-pin (as on the Macintosh) or 50-pin. In keeping with other SCSI peripherals, such as scanners and CD ROM drives, most disk drives use 50-pin connectors. A few, including Liberty Systems' Liberty Stealth 425Q, the La Cie ZFP line, and Procom's MD320 and MD420, have 25-pin connectors. I prefer drives with 50-pin connectors; if a drive with 25-pin connectors is part of a SCSI chain, cabling is more confusing and usually requires the purchase of additional 25-to-25-pin or 25-to-50-pin cables.

Two other facts of SCSI life are termination and SCSI ID numbers. Termination refers to the need for a special resistor, called a terminator, at both the beginning and the end of a SCSI chain. In many drives the resistor is built into the internal electronics; such drives are said to be internally terminated. Internal termination can sometimes be removed by the user—with varying degrees of effort—but more often it requires the skilled hands of a technician. In many other drives, a separate terminator plug—which you attach when necessary to one of the drive's SCSI connectors—comes with the drive. The PLI drives and the Procom MD320 and MD420 allow you to turn internal termination on and off with a switch, which is a pretty convenient way to work with internally terminated drives (see "Hard Drives Compared").

If there are two or more SCSI peripherals connected to a Macintosh, SCSI rules dictate that an internally terminated drive can be attached only at the beginning or end of the chain. If your Macintosh has an internal hard drive, an internally terminated drive can be attached only at the end of the chain. Since setting up a problem-free SCSI chain often requires changing the order of the devices in the chain, the position limitations of an internally terminated drive can be a real pain in the neck. Internal termination is also a problem with the Mac IIfx, which requires a special type of terminator. Internal termination is thus the least desirable of the three alternatives; avoid it whenever possible. External and switchable termination are equally acceptable; a

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At the Quantum disk drive manufacturing facility in Milpitas, California, precision manufacturing in a clean-room environment is required to assemble hard drive mechanisms, visible in the lower right of the photo.

HARD DRIVES COMPARED

Company	Model or Line	Available Capacities [1]	Dimensions H x W x D (in inches)	Termination/ SCSI Selection [2]	Other Features [3]	Partitioning/ Password Protection/ A/UX Support	Other Bundled Software [4]
APS	APS 425	B	2.25 x 10 x 10.25	E/DL	UP	●/○/○	PD
	APS line (except 425)	A, C, D	8 x 9 x 13	E/DL	UP	●/○/○	PD
CMS	Platinum Series PD 320, 650	A, C	5 x 10 x 11.25	I/T	UP	only via SUM II/○/○	SUM II
Enhancements	Platinum Series PD 1000	D	5 x 10 x 11.25	I/T	UP	only via SUMII/○/○	SUM II
Cranel	Cranel line	A, C, D	3.75 x 9.75 x 9.75	E/T	F, UP	●/●/●	no
Cutting	F/H line	A, C	4.25 x 9.7 x 9.7	I/T	F, UP	●/○/○	Backup & Restore
Edge	H/H line	A	2.3 x 9.8 x 9.7	I/T	F, UP	●/○/○	Backup & Restore
Deltaic	Server 320H, 420H	A, B	2.3 x 9.7 x 9.7	E/T	F, UP	○/○/○	no
Systems	Server 1G, 600, 600Q	C, D	4.5 x 9.7 x 9.7	E/T	F, UP	○/○/○	no
DJK	MS-1.3	D	3.75 x 10 x 10.5	E/DL	UP	●/●/●	utilities include backup
Development	MS-410, 710	A, C	3.75 x 10 x 10.5	E/DL	UP	●/●/●	utilities include backup
Ehman	Wren Runner F/H line	A, C	4.25 x 9.7 x 9.7	I/T	F, UP	●/○/○	Backup & Restore
EMac	Metro line	A, C	4 x 9.7 x 10.7	E/T	F, PC, UP	●/●/●	Norton Utilities
FWB	hammer300	A	2.25 x 9.5 x 9.75	E/T	F, UP	only via HD Partition/○/○	Hard Disk Partition, Hard Disk Deadbolt, Hard Disk Utilities
	hammer line (except 300)	C, D	4.5 x 9.5 x 9.75	E/T	F, UP	only via HD Partition/○/○	Hard Disk Partition, Hard Disk Deadbolt, Hard Disk Utilities
GCC Technologies	UltraDrive 430S	B	2.75 x 9.5 x 10.75	E/T	S, UP	●/●/●	SUM II, QuickSpool II, QuickEnvelope
Hard Drives	PowerDrive 320MC	A	2.25 x 9.75 x 10.6	I/T	UP	●/●/●	no
International	PowerDrive 660MC	C	4 x 9.75 x 9.75	I/T		●/●/●	no
	PowerDrive 1050MC	D	4 x 9.75 x 9.75	I/T		●/●/●	no
	PowerDrive I line	A, C, D	4 x 9.75 x 9.75	I/T		●/●/●	no
La Cie	ZFP line	A, B	2.4 x 9.75 x 9.75	I/DP	F (some models), UP	●/●/●	Norton Utilities
	ZFP+ line	C, D	4.75 x 9.75 x 9.75	I/T	F (some models), UP	●/●/●	Norton Utilities
Liberty Systems	Liberty Stealth 425Q	B	5 x 2 x 7	I/DL		●/●/○	no
MacDirect	M line	B, C, D	4.25 x 9.7 x 9.7	E/DL	UP	●/●/●	no
MacLand	Imprimis line	A, C, D	4.25 x 9.9 x 10	I/DL or T	F, UP	●/○/●	no
MacProducts USA	MagicDrive line	A, C, D	3 x 9.9 x 10.5	E/T	UP	●/●/○	PD
MicroNet	MS line	B	2.75 x 10 x 10.4	E/T	UP	●/●/●	no
Technology	SB line	A, B, C, D	6.5 x 7.75 x 12	E/T	UP	●/●/●	no
	SBT line	D	12 x 7.75 x 12	E/T	UP	●/●/●	no
MicroTech	N320	A	2.5 x 9.7 x 10.5	I/T	F, UP	●/○/○	Norton Utilities, Total Recall, PD
International	N400	B	2.5 x 9.7 x 10.5	I/T	F, UP	●/○/○	Norton Utilities, Total Recall, PD
	N650	C	4 x 10.9 x 11.1	I/T	F, UP	●/○/○	Norton Utilities, Total Recall, PD
	N1000	D	4 x 10.9 x 11.1	I/T	F, UP	●/○/○	Norton Utilities, Total Recall, PD
Mirror Technologies	M333	A	9 x 7.75 x 12	E/DL	UP	●/●/●	Gofer, Inside Information, QuicKeys Lite, DiskTop 3, PD
	M595	C	9 x 7.75 x 12	E/DL	UP	●/●/●	Gofer, Inside Information, QuicKeys Lite, DiskTop 3, PD
Optima	Concorde 635, 1350	C, D	4.25 x 11.4 x 10.2	E/T	EP, TP, UP	●/●/●	SUM II
Technology	Concorde 1050	D	4.25 x 11.4 x 10.2	E/T	EP, TP, UP	●/●/●	SUM II
Corporation	DisKovery line	A, B	2.45 x 11.42 x 10.2	E/T	EP, TP, UP	●/●/●	SUM II
	MiniPak line	A [5]	2.45 x 6.2 x 7.8	E/T	EP, TP, UP	●/●/●	SUM II
PLI	PL320 WD Turbo	A	2.4 x 9.8 x 9.8	S/DL	F	●/○/●	PD, Turboware Utilities
	PL330, PL400 Turbo	A, B	2.4 x 9.8 x 9.8	S/DL	F	●/○/●	PD, Turboware Utilities
	PL Turbo line (except 320WD, 330, 400)	A, C, D	5 x 9.8 x 11	S/D or T	F	●/○/●	PD, Turboware Utilities
Procom	MD line (except 320, 420)	A, C, D	6.25 x 7.5 x 12	E/DL	UP	●/●/●	911 Utilities, Virex
Technology	MD320, MD420	A, B	2.5 x 9.7 x 10.25	S/DL	UP	●/●/●	911 Utilities, Virex
Relax Technology	Vista line	A, C	3.8 x 10.2 x 10.8	E/T	UP	●/●/●	Relax & Save
	Hard Plus line	A, C, D	3.8 x 10.2 x 10.8	E/T	UP	●/●/●	Relax & Save
Rodime Systems	Cobra e line	A, C, D	4.1 x 7 x 14.6	E/T	AP, SP	●/●/●	Redux
Storage	MacinStor 325-S1	A	5.75 x 7.6 x 14.5	E/DL	F, M, UP	●/●/●	MacTools Deluxe
Dimensions	MacinStor S1 line (except 325)	C, D	5.75 x 7.6 x 14.5	E/DL	F, M, UP	●/●/●	MacTools Deluxe

● = yes; ○ = no. [1] A = 300MB to 360MB, B = 400MB to 430MB, C = 580MB to 660MB, D = 950MB to 2GB. [2] DL = dial, DP = DIP, E = external, I = internal, S = switchable, T = thumb. [3] AP = auxiliary power outlets, EP = external power-supply connector, F = external fuse, M = util. software offers mirroring, PC = SCSI bus protective circuit, S = security loop, SP = surge protection, TP = termination power indicator, UP = universal power supply. [4] PD = public domain and shareware collection. [5] MiniPak 500 available.

switch is a bit more convenient, since there's no terminator plug to lose.

In addition to proper termination, every peripheral on a SCSI chain must have an ID number from 0 to 6 (the Macintosh itself is always 7), and no two peripherals can have the same number. You can set the SCSI ID number with a thumb switch or a rotary dial, a DIP switch, jumpers (metal prongs that are either capped with a plastic sleeve or uncapped), or through software. Switches are the most convenient, and fortunately they are found on most of the large-capacity drives reviewed here. You can override the SCSI ID setting with the utility software provided in some drives, including those from Cranel and MacProducts, but the confusion this

can cause to the unknowing or forgetful is probably more hassle than it's worth.

Driving the Speed Limit

One of the great joys of large-capacity hard drives is that they're so much faster than their smaller relatives. The speed of a drive can be objectively measured in a variety of ways (see "Hard Drive Speed Tests 300MB–950MB" and "Hard Drive Speed Tests 1GB and Up"). Data-transfer rates, which Macworld Lab measured with the test program SCSI Evaluator, indicate the speed with which data can be written to or read from the drive.

Since both seek time and transfer rates assume ideal conditions rarely seen in the real world, Macworld Lab also conducted a number of tests involving the opening, saving, and duplicating of large and small files and the compiling of computer code (which requires both reading and writing of data). The real-world test results are combined with the other two measures to produce an overall speed index for each drive. For convenience, we divided the tested drives into two large groups—drives between 300MB and 950MB and drives 1GB and up—and calculated the various indexes for the two separately. (For technical reasons, seek times were not available for drives 1GB and up.)

The speed of all the drives we tested is so great that they can easily outrun the ability of a Macintosh Plus to process the incoming information. With the exception of EMac's Metro drives (which use Maxtor XT mechanisms) and PLI's PL320 WD Turbo (which is the only tested drive that uses a Western Digital mechanism), all tested drives can also outrun a Macintosh SE or a Classic. Although few Plus and SE owners are likely to want drives above 300MB, those who do can assume that all but the three mentioned above will perform faster than the SCSI-transfer speeds such Macs allow.

When used with members of the Macintosh II family, on the other hand, not all large-capacity drives are equally fleet-footed. Among drives smaller than 950MB, the consistently fastest drives are those in the 650MB range based on the Seagate ST4767 mechanism, those in the 330MB range based on the half-height Seagate ST2373 mechanism, those in the 600MB range based on the Seagate ST4702 mechanism, and all the drives in the 410MB range (based on either the Seagate ST2502 or the Quantum PD425S).

At the bottom of the speed scale—joining the especially slow EMac Metros and the PLI PL320 WD Turbo—are a number of drives in the 330MB range, including those based on Seagate ST4350, ST4376, and ST4385 mechanisms and several Micropolis mechanisms. Aside from the EMac Metro 670, the few drives over 400MB that we

MW LAB Noise Test

Drives 300MB–950MB

	Decibels
Mirror Technologies M595	35.8
FWB hammer300FMF	38.1
FWB hammer300	38.9
La Cie ZFP+ 640MB	39.7
Microtech N400	40.1
HDI PowerDrive 660MC	40.7
FWB hammer600	40.7
Optima Concorde 635	40.8
MicroNet SB-303NP	40.8
CMS Enhancements Platinum PD 650	40.9
GCC UltraDrive 430S	41.5
Cutting Edge 330MB F/H Wren Runner	41.7
Liberty Systems Stealth 425Q	41.9
MacLand Imprimis 330	42.2
Optima DisKovery 325	42.4
La Cie ZFP+ 600MB	42.7
MacLand Imprimis 600	42.8
MacLand Imprimis 300	42.8
PLI PL645 Turbo	43.7
APS 330 Runner	43.7
PLI PL320 WD Turbo	43.7
Procom MD420	44.0
HDI PowerDrive 600I	44.1
Rodime Cobra 330e	44.2
CMS Enhancements Platinum PD 320	44.4
Mirror Technologies M325	44.6
La Cie ZFP 420	44.9
PLI PL300 Turbo	45.1
PLI PL635 Turbo	45.2
La Cie ZFP 320	45.5
Cutting Edge 660MB F/H Wren Runner	45.7
Relax Vista 600	46.0
Ehman 660MB F/H Wren Runner	46.3
HDI PowerDrive 320MC	46.5
Relax Hard Plus 330 - Runner	47.1
Ehman 330MB F/H Wren Runner	47.2
Storage Dimensions MacinStor 650-S1	47.2
Rodime Cobra 650e	47.2
MacProducts USA MagicDrive 600	47.3
MicroNet SB-644NP	47.6
MacProducts USA MagicDrive 300	48.2
Storage Dimensions MacinStor 325-S1	48.7
FWB hammer600FMF	48.8
HDI PowerDrive 320I	50.3
DJK Development MS-410	50.6
EMac Metro 335	51.0
Relax Hard Plus 660 - Runner	51.7
EMac Metro 670	51.9
Deltaic Server 320H	52.9

Drives 1GB and Up

	Decibels
La Cie ZFP+ 1.2G	40.0
HDI PowerDrive 1050MC	41.1
HDI PowerDrive 1050I	41.4
Optima Concorde 1050	41.6
MacLand Imprimis 1.2G	41.7
FWB hammer1000	42.5
PLI PL1.2GIG Turbo	43.4
MicroNet SB-1300NP	44.1
Procom MTD1000	44.4
Microtech N1000	44.9
CMS Enhancements Platinum PD 1000	45.2
MicroNet SBT-1288NP	45.5
Cranel 1G	45.5
Rodime Cobra 1000e	47.4
Storage Dimensions MacinStor 1020-S1	48.2
Relax Hard Plus 1.0 Gig - Wren	48.9
MacDirect Fujitsu 1.2GB	52.0

Quietest drive

Less than twice as loud as quietest drive

More than twice as loud as quietest drive

Drives are ranked here from quietest to loudest by their decibel level during normal operation. A decibel is a measurement of sound pressure, which is what the human ear responds to. The minimum change in sound that the human ear can detect is 3 dB. Because decibels are a logarithmic unit of measurement, if a sound increases by 10 dB, it sounds approximately twice as loud as it did before.

Each person has a different tolerance for background noise. To give you some idea of how these drives would fit into normal operating environments, a quiet bedroom has an average decibel level of 25 dB; a living room, 40 dB; and an average office, 65 dB. We found that drives measuring about 48 dB were noisy enough to be an irritation in our office environment.

found to be noticeably slow were Mirror Technologies' M595, Rodime's Cobra 650e, MacLand's Imprimis 600, Storage Dimensions' MacinStor 650-S1, and La Cie's ZFP+ 600MB. As for 1GB-and-up drives, the majority are 1010MB drives based on a Seagate ST41200 mechanism. Since drives based on other mechanisms perform as well or better, there are no poor performers in this size range.

In overall performance ratings for both groups, two vendors in particular stand out. One is MicroNet, whose NuPort drives turn in outstanding performances (see "Giving SCSI the Runaround"). The other is FWB, whose hammer drives are always expensive and almost always exceedingly fast. The hammer600FMF, for example, is right behind the top-rated MicroNet SB-644NP; the hammer300 and 300FMF share the top spot in the 330MB range with the MicroNet SB-303NP; and the hammer1000 is hot on the heels of the two MicroNet drives at the top of the 1GB group.

Smaller Than a Bread Box

With one exception (Liberty Systems' Liberty Stealth 425Q, which is black), the large-capacity hard drives are housed in platinum-color metal or plastic boxes. (Unless you tap the case with your finger, metal and plastic boxes are more or less indistinguishable from each other.) In general, the hard drive housings come in one of three standard shapes. The most common shape, known as the zero footprint design because it doesn't take up desktop space, lies flat and measures about 10 inches square. The one major variable in this design is height, which varies from a sleek 2¼-inch-high pizza box (in the APS 425 and FWB's hammer300, for example) to a stately 5-inch-high hat box (in CMS's Platinum line). Sleek or stately, these drives tuck neatly beneath a compact Mac or atop a IIsi or IIcx.

ROBIN GINSBERG

Recommended 300MB drives include the Mirror M325, the La Cie ZFP 320, and the FWB hammer300.

The shoe box design is taller, narrower, and longer than the zero footprint case. Some shoe box cases (as in Storage Dimensions' MacinStor drives) are slightly less than 6 inches high and fit inconspicuously beside a Mac II. Others, like the APS 330 Runner and MicroNet's SB-303NP and SB-330 (despite their relatively small capacity), are an inch or two taller and don't seem to fit anywhere very conveniently.

Finally, there's the small-and-thin design, available in flat or upright orientations. The flat version looks like an oversize modem. The upright version (such as Liberty's exceptionally small Stealth 425Q) sits like a book balanced on its spine; although it requires very little desk space, the ease with which it can be tipped over makes me nervous. Whichever drive you choose, make sure its size and shape match the place you want to put it. A few drives (including those from EMac and Optima Technology) have movable feet that give you two orientations (flat and upright) for the price of one; like the Liberty Stealth 425-Q, however, most of these drives seem too tippy when placed upright.

Few high-capacity drives are likely to win any beauty contests. By far the ugliest are those in which the black metal faceplate of the drive mechanism lies exposed—IBM style—in the front of the case. (Offenders include drives from APS, Cranel, MacProducts, Mirror, and Relax.) The best-looking ones, those that best match the design of the Mac itself, include the drives from Cutting Edge, Ehman, FWB, GCC, Liberty, MicroNet, Rodime, and Storage Dimensions. But even if good looks don't interest you, beware of shoddy construction. A gap between the top of the faceplate and the top of the case in Relax's Vista 600 and MacProducts' MagicDrive 600 is not only unsightly, but also an obvious place for dust and dirt to enter. Another problem in some drives (including those from Cranel, Ehman, and Relax) is a poorly constructed back panel that bends when you attach or remove cables.

Most drives have two LED indicator lights, one for power and the other for drive activity; a few, including drives from CMS, Cranel, La Cie, and PLI, have an activity light only. In general, I recommend two-light models, since a power light is a useful reminder to turn off the drive at the end of the day. Almost all large-capacity drives contain universal power supplies that can automatically adjust to either 120- or 220-volt power (see "Hard Drives Compared"). External fuses are handy (they can save you a trip to the repair shop) and are standard equipment on about half of all large-capacity drives. Other conveniences are rare. Notable ones include the provision for an external power supply and a special termination power indicator on Optima drives, the extra power outlet on Rodime drives, and the se-

MW LAB Hard Drive Speed Tests 300MB—950MB

Color Key

- Fastest
- **Percent slower than fastest**
- Up to10%
- 11%–20%
- 21%–29%
- 30% or more

The drives are listed from best overall performance (top) to worst overall performance (bottom), based on both application and SCSI Evaluator low-level tests. To determine the ranking, we indexed overall performance numbers against the fastest drive. Thus, the MicroNet SB-644NP gets a 1.00 and the slow EMac Metro 670 gets a .53. Index numbers are listed next to the product name.

On the application tests, we tested each drive's ability to duplicate a large (3.2MB) file and search a database for a specific record. We also averaged the drive's speeds for opening and saving files from several applications including PageMaker and Excel.

Mechanism Key

F1= Fujitsu M2261S
H=Hitachi DH515C
HP= HP 97549T100
IBM= 0661371 (Western Digital)
M1= Maxtor XT
M2= Maxtor XT-8380S
MC= Micropolis
MC1= Micropolis 1588
MC2= Micropolis 1684
Q = Quantum PD425S
S1= Seagate ST41600N
S2= Seagate ST2502
S3= Seagate ST2383
S4= Seagate ST4350
S5= Seagate ST4376
S6= Seagate ST4385
S7= Seagate ST4702
S8= Seagate ST4766
S9= Seagate ST4767

		Duplicate (in seconds)	Open (in seconds)	Save (in seconds)	Search (in seconds)	Compile (in seconds)	SCSI Evaluator Read (in kbps)	SCSI Evaluator Write (in kbps)
Overall Fastest	1.00	MicroNet SB-644NP (S9)	64.0	62.9	33.6	46.1	72.6	18195	16651
	0.98	FWB hammer600FMF (S2)	43.3	64.3	35.3	46.7	73.2	14756	12736
	0.95	Ehman 660MB F/H Wren Runner (S2)	49.2	64.6	35.9	46.6	73.9	15148	11552
	0.92	PLI PL635 Turbo (S2)	53.6	65.2	37.1	45.5	72.9	14322	11048
	0.92	Cutting Edge 660MB F/H Wren Runner (S2)	52.6	65.6	36.2	47.3	74.1	14270	11084
	0.91	MicroNet SB-303NP (S3)	69.9	66.1	41.0	51.1	83.4	16737	16311
	0.91	GCC UltraDrive 430S (S2)	50.6	68.2	42.0	51.5	82.1	14822	12719
	0.90	FWB hammer300FMF (S7)	49.2	64.9	40.5	48.6	79.4	12987	11581
	0.90	FWB hammer300 (S3)	50.0	67.8	41.5	51.5	81.2	14498	11554
	0.90	Relax Hard Plus 660 - Runner (S9)	55.2	66.4	36.5	48.2	75.0	13580	10941
	0.88	MacProducts USA MagicDrive 600 (S7)	57.8	64.4	38.4	49.0	82.0	12873	11564
	0.87	Deltaic Server 320H (S3)	62.5	68.6	42.4	51.9	84.6	15084	12100
	0.87	La Cie ZFP + 640 (S9)	58.1	65.2	39.4	49.1	79.5	12147	11524
	0.87	La Cie ZFP 320 (S3)	57.9	68.5	42.6	51.9	85.0	14579	11563
	0.87	CMS Enhancements Platinum PD 650 (MC1)	59.1	67.3	39.4	50.7	80.5	12313	11427
	0.86	Relax Vista 600 (S7)	58.3	67.1	40.2	50.6	82.2	12895	11614
	0.86	HDI PowerDrive 660MC (MC)	63.5	66.1	43.4	50.5	80.3	12368	11774
	0.86	Liberty Systems Stealth 425Q (Q)	60.3	64.8	42.2	48.1	78.9	13798	9568
	0.86	FWB hammer600 (S7)	50.7	64.2	73.5	48.8	81.7	12963	10801
	0.86	HDI PowerDrive 600I (S7)	58.2	63.5	43.9	48.9	80.6	12890	10763
	0.85	Storage Dimensions MacinStor 325-S1 (S3)	60.6	68.5	40.7	51.7	82.8	13267	10818
	0.85	La Cie ZFP 420 (S2)	60.4	68.4	41.5	52.2	82.6	13357	10792
	0.85	Procom MD420 (S2)	60.2	69.5	41.1	51.7	83.0	13123	10780
	0.84	Microtech N400 (S2)	60.9	69.5	42.7	52.1	82.3	13081	10190
	0.83	Optima DisKovery 325 (S3)	58.2	69.3	42.1	51.9	84.9	12685	9731
	0.83	Mirror Technologies M325 (F1)	64.7	67.3	37.5	48.5	77.0	10308	9516
	0.83	DJK Development MS-410 (M2)	61.7	67.7	42.6	50.5	84.7	11970	10760
	0.82	PLI PL645 Turbo (S8)	62.7	71.2	42.9	49.1	81.3	12138	10082
	0.82	Optima Concorde 635 (H)	63.5	67.8	47.1	52.4	86.6	13987	9623
	0.80	CMS Enhancements Platinum PD 320 (MC2)	64.5	67.8	43.7	50.2	83.4	11193	8539
	0.80	HDI PowerDrive 320MC (MC)	64.0	66.7	43.9	50.3	98.4	11121	10131
	0.77	La Cie ZFP+ 600 (S7)	69.2	86.0	46.8	67.5	96.3	12917	12942
	0.75	PLI PL300 Turbo (S4)	70.0	74.9	46.4	51.0	85.9	9577	8400
	0.74	Storage Dimensions MacinStor 650-S1 (M1)	71.4	87.1	48.0	69.9	99.8	12617	12242
	0.73	Mirror Technologies M595 (S7)	71.4	85.9	46.4	67.3	96.7	11170	11039
	0.73	Ehman 330MB F/H Wren Runner (S6)	71.4	86.5	46.3	67.4	97.1	11097	11111
	0.73	MacLand Imprimis 330 (S6)	70.2	86.5	45.7	67.6	95.1	11093	10654
	0.73	Cutting Edge 330MB F/H Wren Runner (S6)	71.4	84.1	45.9	67.6	96.7	11107	10665
	0.72	APS 330 Runner (S6)	70.7	86.5	45.2	67.3	97.5	11201	10317
	0.72	MacLand Imprimis 600 (S7)	70.5	86.8	46.4	67.7	98.6	11100	10654
	0.72	Rodime Cobra 650e (MC1)	72.0	88.0	49.6	70.3	99.8	12176	10507
	0.70	Rodime Cobra 330e (MC2)	73.4	88.9	50.6	70.4	100.9	10992	10406
	0.70	HDI PowerDrive 320I (S5)	72.9	86.0	52.7	70.2	101.2	10994	11005
	0.68	MacProducts USA MagicDrive 300 (S4)	75.5	87.8	50.0	71.1	101.8	10126	9093
	0.67	Relax Hard Plus 330 - Runner (S4)	77.1	90.4	50.8	71.9	103.1	10170	9149
	0.66	MacLand Imprimis 300 (S4)	76.8	89.9	49.8	71.4	101.7	9423	8415
	0.62	EMac Metro 335 (M1)	104.4	78.1	49.8	52.0	87.1	4426	4574
	0.59	PLI PL320 WD Turbo (IBM)	107.9	84.8	51.5	53.3	89.3	4245	4208
Overall Slowest	0.53	EMac Metro 670 (M1)	112.1	94.1	55.2	70.8	101.7	4440	4570

curity loop (for use with security cable kits) on GCC drives.

Software as well as Hardware

All the drives we tested are delivered formatted and ready to run. Some include the most current version of Macintosh system software; others require that you provide your own. All units come with a utility program that enables you to reformat the drive and reinstall the driver (the software that enables the drive to work with a Macintosh), should that be necessary. Some vendors, such as Storage Dimensions, GCC, PLI, and Rodime, produce utilities that are tailored

SERVICE TABLE

Company	Method of Sale	Warranty (in years)	Extended Warranty Available	Repair Turnaround (in days)	Data Recovery/ Charges	Tech-Support BBS	Free Tech-Support Line
APS	direct	1	○	2	●/●	○	●
CMS Enhancements	dealer	1	●	2	○/NA	●	○
Cranel	direct	5	○	30[1]	○/NA	○	●
Cutting Edge	dealer	2	○	(through dealer)	(through dealer)	○	○
Deltaic Systems	dealer/direct	1	●	3	variable	○	●
DJK Development	direct	5[2]	○	7 to 10	●/○	○	○
Ehman	direct	2	●	5	○/NA	●	○
Emac	dealer	2	○	3	○/NA	●	○
FWB	dealer	1	●	2	●/○	●	○
GCC Technologies	dealer/direct	2	○	2	●/○	●	●
Hard Drives International	direct	1	●	2	○/NA	○	●
La Cie	direct	1	○	2 to 3	●/●	○	●
Liberty Systems	direct	1	●[3]	1	●/●	○	○
MacDir	direct	5	○	2[1]	●/○	○	●
MacLand	direct	2	○	2	●/○	○	●
MacProducts USA	dealer/direct	2	●	2 to 4	●/○	●	○
MicroNet Technology	dealer	1	●	2	○/NA	○	○
MicroTech International	dealer	5	○	2	●/○	●	●
Mirror Technologies	direct	2	●	2	●/●	●	○
Optima Technology Corporation	dealer	1	●	same day	○/NA	●	○
PLI	dealer	1	●	2	●/○	●	●
Procom Technology	dealer	1	●	2	○/NA	●	○
Relax Technology	dealer/direct	1	○	2	●/●	○	○
Rodime Systems	dealer	2	○	1[4]	○/NA	○	○
Storage Dimensions	dealer	2	○	1 to 2	○/NA	○	○

● = yes; ○ = no [1] 1 day with special warranty. [2] MS-1.3 drive has 2-year warranty. [3] With purchase of carrying case. [4] First year only, 3-day turnaround thereafter.

specifically to their own drives and are, usually, easier to use. Other vendors include commercially available utilities such as Disk Manager Mac (HDI), Silverlining (La Cie), Disk Utility (Relax and MacDirect), and SCSI Director Professional (DJK).

Most utilities let you subdivide a drive into smaller pieces called partitions (see "Hard Drives Compared"). The Mac treats each partition as if it were a separate volume (drive)—a useful pretense, given the Finder's current limit of about 3000 files per volume. Most utilities enable you to password-protect individual partitions, and most let you format partitions in standard Macintosh, A/UX, and other formats. Most utilities also allow you to select the interleave factor (the way sectors are numbered on a hard drive) during formatting. Until recently, this would have been essential for optimum performance with a Mac Plus, SE, or Classic. Almost all large-capacity drives now have a little gadget called a read-ahead cache, however, which tosses interleave settings into the dustbin of unnecessary utility functions.

Some drives come bundled with familiar commercial utilities, such as MacTools Deluxe, SUM II, 911 Utilities, Gofer, Norton Utilities for the Macintosh, QuicKeys, and others. A few include well-known backup programs such as Redux and respected antivirus programs such as Virex. These are nice bonuses, but unless you must choose between two drives that are otherwise equal, they shouldn't be a deciding factor. On the other hand, software features that are rare or otherwise unavailable, such as the disk-mirroring function in Storage Dimensions' utility program (which creates a duplicate copy of your data on another hard drive), may very well override most other concerns if the feature is important to you.

You Can Look It Up

Termination, SCSI ID, interleave, drivers, and other esoterica can easily befuddle a new hard drive owner. A good manual can help explain such mysteries; unfortunately, a good manual is hard to find. Some vendors, such as Cranel, MacLand, and Hard Drives International, provide either no manual at all or a manual that's not much better than none at all. Only a few—including Cutting Edge, Ehman, GCC, Optima, and Rodime—provide manuals that are complete, comprehensible, and well organized. If you're at all shaky concerning the ins and outs of hard drives, be sure to buy a drive with a good manual—or make friends with a power user in your local user group.

If you look it up in the manual and you still can't figure it out, it's useful to be able to call for help. All of the hard drive vendors offer technical support by phone, but only some of them offer a toll-free support line. Some vendors also operate or participate in an electronic bulletin board from which you can obtain answers to questions or download the most recent versions of driver or utility software. Vendors also differ in the length of their warranty (ranging from a stingy one year to a very generous five years), the availability of an optional extension, the time the company claims it takes to repair a broken drive, and whether data recovery is included in the repair.

Because I work in a quiet room at home, I also want to know how noisy a drive is. If you work in a quiet location, such as a library or an enclosed office, we recommend the drives our tests measured at 40dB or less (see "Noise Test"). If you work in a large, open office or have a Mac II system unit—and its whirring fan—sitting on your desk, drives rated at 48dB or less are not likely to have a noticeable effect on your sound environment. The drives rated at over 48dB can be heard in almost any work environment—except where typewriters are in constant use—and are not recommended.

The Final Tally

Last but not least is the question of how much all this new storage space is going to cost. In general, drives from APS, HDI, La Cie, MacLand, and Mirror tend to be the best bargains in each size range. On the opposite end of the scale, drives from Cutting Edge, FWB, MicroNet, Optima, PLI, and Rodime are usually the costliest, although street prices may, in some cases, be significantly lower than the suggested retail price.

All told, my ideal large-capacity drive would be small, fast, quiet, good looking, and inexpensive. It would have external termination, a switch or dial for changing the SCSI ID, two LEDs, a good manual, a two-year-or-longer warranty, and utility software that's full-featured and easy to use. None of the drives we tested fit those requirements perfectly, but many come close enough to win our admiration.

For the budget-minded willing to accept such inconveniences as internal termination, poor manuals, slightly slower speeds, and clunky cases, we recommend Mirror Technologies' M333 ($1297), La Cie's ZFP 320 ($1799) and ZFP 420 ($1899), DJK Development's MS-410 ($1899), HDI's PowerDrive 660MC ($1899) and 1050I ($2699), and MacLand's Imprimis 1.2GB ($2999). On the opposite extreme, for those who want the best drive possible, regardless of cost, we recommend FWB's hammer300 ($2999), 300FMF ($3749), 600FMF ($5399), and 1000 ($5899); MicroNet's SB-303NP ($3445), SB-644NP ($5295), SB-1288/NP ($9990), and SB-1300NP ($7995); and Optima's Concorde 1050 ($5995).

For the rest of us, those who must temper high ideals with financial restraint, we recommend Deltaic's Server 320H ($2499) if you don't mind the high noise level, Optima's DisKovery 325 ($2495), Storage Dimensions' MacinStor 325-S1 ($2099), Liberty's Stealth 425Q ($2299), GCC's UltraDrive 430S ($2699), MacProducts' MagicDrive 600 ($2350), Relax's Vista 600 ($2619) and 660 - Runner ($2349), Ehman's 660MB F/H Wren Runner ($2489), La Cie's ZFP+ 1.2G ($4599), and Storage Dimensions' MacinStor 1020-SI ($5099).

GIVING SCSI THE RUNAROUND

Speed test results for MicroNet's NuPort drives are significantly better than those for almost all other drives we tested. One key to this remarkable record is that NuPort drives use superfast Seagate drive mechanisms. The other major factor is that the drives are connected to the Macintosh not through the SCSI port, as one would expect, but by means of a NuBus board supplied with the drive. By bypassing the SCSI port and its controller, the NuPort system can transfer data to the Macintosh as fast as the drive can dish it out, yielding dramatic increases in both data-transfer test results and real-world performance.

But MicroNet isn't the only vendor that recognizes the performance bottleneck created by the Macintosh SCSI controller. Storage Dimensions has announced its Data Cannon board in both NuBus and even faster PDS (processor direct slot) versions (the NuBus slot, too, can be a bottleneck for speedy transfers); they work on the same principle as the NuPort board and should be available in the spring. DayStar Digital's SCSI PowerCard, available now, is a NuBus board that combines a Mac SCSI controller bypass with special caching software and a 1MB, 4MB, or 16MB memory buffer.

Because they add a second SCSI port, all three boards double the number of SCSI devices you can chain to the Macintosh. The NuPort and Data Cannon boards can be purchased only with a new MicroNet or MacinStor drive, or as an upgrade. The NuPort board adds $600 to the retail price of a MicroNet drive, while Storage Dimensions reports that a Data Cannon board will add $870 to the retail price of its drives. DayStar's SCSI PowerCard is much more expensive (the retail price of the board alone, without any of the required cache memory, is $1499), but it is available separately and thus can be paired with any drive. And unlike with the NuPort and Data Cannon boards, which can boost the performance of only the fastest drives, DayStar says that even habitually slow mass storage devices, such as optical and CD ROM drives, will show significant speed gains with a SCSI PowerCard.

On the whole, there are few drives that we recommend against buying. Specifically, we suggest you avoid the exceedingly slow EMac Metro 335 ($2499) and 670 ($3395). Also on our caution list are a few drives that, in our tests, refused to act as start-up drives: HDI's PowerDrive 320I ($1449) and 600I ($1799), and CMS Enhancements' Platinum Series PD 320 ($3099). (If you have two or more hard drives, this may not cause you any difficulties.) Otherwise, I'm happy to report that the quality of large-capacity hard drives continues to go up, even as prices go down, and that's welcome news for anyone itching to enlarge their megabyte horizons. M

See *Where to Buy* under Large-Capacity Hard Drives for contact information.

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CONTROL: SYSTEM 7.0
MULTITASKING / GO
VIRTUAL MEMORY / GO
COMPATIBILITY CHECKER / GO

10...9...8...7...6...5...4...3...2...1...ALL SYSTEMS GO ..

QUERY:

ALIASING:

DATA ACCESS:

The long wait is over.

Time to make your move.

B Y L O N P O O L E

CONFESSIONS OF A SYSTEM 7 USER

YOU'VE BEEN HEARING ABOUT this famous System 7 for years—literally. Now it's finally here. The disks, the manuals, the box, and the shrink wrap are on your Apple dealer's shelf and can be yours for $99. (You can buy a group upgrade kit for $349; prices are subject to last-minute change.) Now that you can get this long-awaited upgrade to Macintosh system software, the question is, should you?

Emphatically yes. Dollar for dollar, System 7 is the best enhancement you can add to the Mac—even if you have to add more memory to use it. The new Finder in System 7 is worth the cost alone. In addition, you get sharper text, built-in file sharing, and a whole lot more (see "System 7 Boiled Down"). Such a blanket endorsement may surprise you. Anyway, making it surprised me. When I first started working with System 7, I expected to find that its new capabilities would make it overly complex for a typical Macintosh user—witness the vast majority of System 6 users who shun MultiFinder. But most of System 7's complexity remains hidden until you seek it out. One exception is multitasking, which you may find disorienting if you aren't already accustomed to MultiFinder.

Not that it's all rosy. A few minor problems surfaced that I wouldn't have anticipated. For instance, even those accustomed to MultiFinder must learn new techniques for switch-

MARK JASIN

ing between programs. Everyone must learn new methods for editing icon names. And, there are surprises in store when you use directory dialog boxes to open and save files.

Some users might upgrade to System 7 and barely notice the difference, at least at first. In the following pages I describe the new capabilities as you will probably encounter them. (The descriptions are based on 7.0b4, a prerelease version, and it's possible that names and icon designs have changed somewhat since then.)

New Menus

The first clue to these new capabilities is in the System 7 menu bar. There are two new permanent menus at the right end of the bar: the Help menu and the Application menu.

The Help menu lets the Mac explain itself. A Show Balloons command in the menu turns on System 7's optional *balloon help* feature. When balloon help is turned on and you place the pointer over an object, a concise description of the object appears in a cartoon-style balloon. Aside from balloons appearing and disappearing, everything else works normally. You may perceive a slight delay as help balloons come and go, especially if you use a slower Macintosh.

Balloon help knows about all standard objects in the Macintosh interface. However, it cannot describe a specific program's menu commands, window contents, dialog boxes, and so forth. For that to happen, the program must be revised to include the necessary help balloons.

Multitasking

With System 7, multitasking is no longer optional, and even those familiar with MultiFinder may need balloon help and their wits about them to get used to the new environment.

Just as with MultiFinder, the Finder is always available without quitting the program you're using, and you can have as many programs open simultaneously as will fit in your computer's memory. Multitasking's valuable benefits sometimes have disorienting side effects, however. For instance, you may think the program you're using has unexpectedly quit when actually you've switched to another open program by clicking one of its windows. You must condition yourself to look at the menu bar when you need to know which open program is currently active.

System 7's Top Ten Desktop Surprises

The first clue that a user is running under System 7 will be the new look of the Finder. Here are the top ten visual cues.

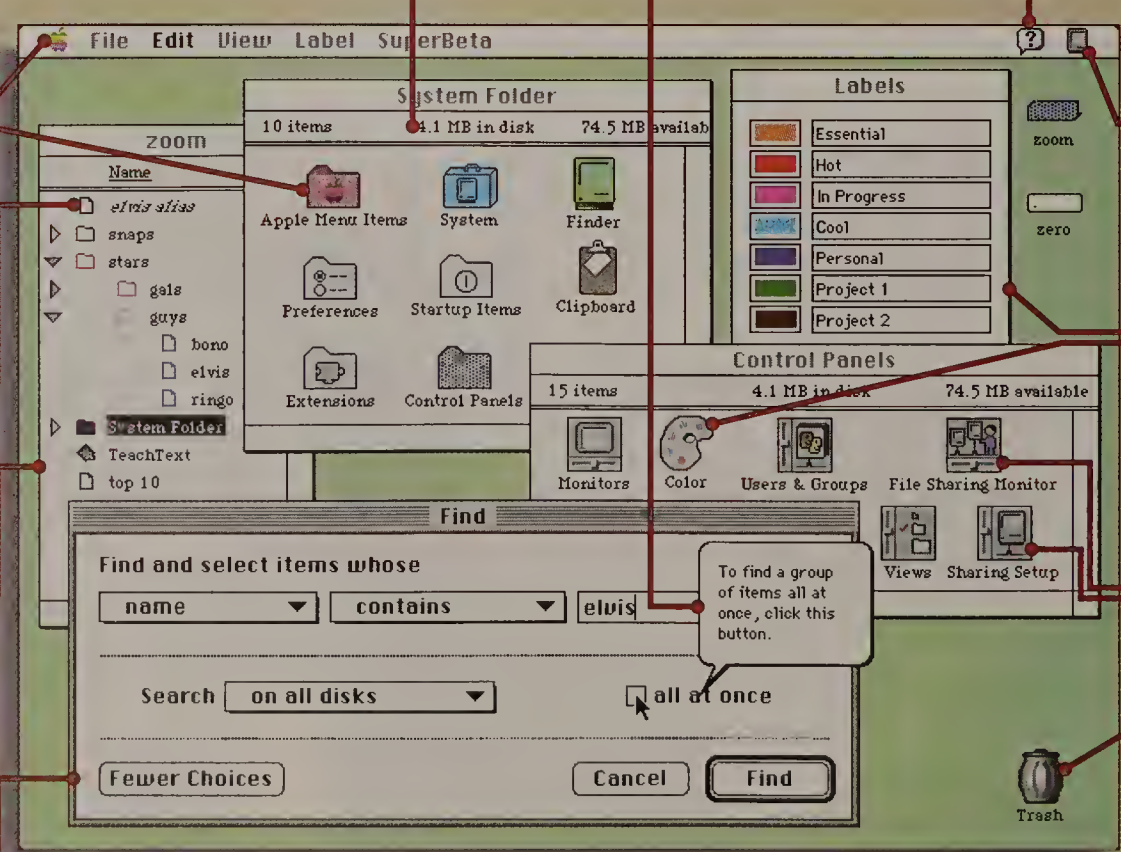
1 Finder text
Text is no longer restricted to Geneva font for desktop display. You change the display font in the Views control panel.

2 Apple menu
You no longer install desk accessories with Font/DA Mover; now you simply drop them into the Apple Menu Items folder in the System Folder.

3 Alias files
Choosing Make Alias from the File menu lets you create a 1K to 3K stand-in file; you can recognize them by their italicized names.

4 Folder structure
In Name view, a window's folders appear in an indented outline. To show or hide a folder's contents, you click on the triangle next to its icon.

5 Find
Using the new Find command, searches are much more specific.



6 Help menu
Besides offering a variety of Finder Shortcuts, the new Help menu lets you turn balloon help on and off.

7 Application menu
Rather than listing open applications under the Apple menu, as MultiFinder did, System 7 lists them under this new menu.

8 Color
Assign colors from the Label menu to color-code icons. You can also choose colors for title bars, scroll bars, and highlighted text from the Color control panel.

9 3-D Icons
In Icon view, you see shaded, 3-D icons.

10 Trash
The Trash Can no longer automatically empties; it remains bulging until you choose the Empty Trash command from the Special menu.

The active program's icon appears at the right end of the menu bar as the placeholder for the new Application menu. That menu lists the programs that are currently open; choosing a listed program makes it the active program (see "Multiple Programs Open"). The Application menu also enables you to hide program windows without closing them or quitting programs, thereby reducing window clutter. For more information on dealing with MultiFinder, see "Getting Started with System 7," elsewhere in this issue.

Apple Menu

Under MultiFinder using older system software, open programs were listed in the Apple menu. In System 7, the Application menu takes over listing open programs, and the Apple menu has a new role: it expedites opening anything you use frequently, including documents, application programs, desk accessories (DAs), folders, control panels, and even fonts and sounds.

You put an item in the Apple menu by dragging it into the Apple Menu Items folder, which is located in the System Folder. The item becomes instantly available in the Apple menu. (There's no need to restart the Macintosh.)

Color Windows and Icons

Aside from the new systemwide menus (Apple, Help, and Application), the most pervasive change in System 7 is its use of color. Trendy three-dimensional shading modernizes all types of standard windows and dialog boxes—on monitors displaying at least 16 grays or 256 colors, that is. This doesn't do much to improve your productivity, but it sure makes you feel better when you see a Next computer.

Additionally, standard Apple icons have three-dimensional shading on monitors that display at least 16 colors or grays. Most other icons are black-and-white (software developers will probably add color when they upgrade their products for System 7 too). You can customize any icon by pasting a picture from a painting or drawing program into the icon's Get Info window.

New Views

In the improved Finder, you can see, select, and reorganize items from different folders in the same window. All *list views* (name, size, kind, and so forth) display folders and their contents in an indented outline format. The levels of indention clearly diagram the structure of nested folders. By clicking a triangle next to a folder's icon, you can show or hide the corresponding folder's contents.

The new Finder also lets you control how icons and window contents are displayed. Using the Views control panel, you can pick the font and size of item names and window headings for all views. You can set the alignment of icons in the Icon and Small Icon views.

For list views, you select the icon size, pick which columns of information you want to see, and more. Your Views control panel settings immediately affect all windows.

Finding Items

No more jokes about the Finder not finding anything. The new Find command (located in the File menu) finds and fetches lost items for you quickly—no more hunting through folders and disks for a misplaced file—a chore even with the new outline views.

In its simplest form, the Find command looks through all disks whose icons are on the desktop for an item whose name contains the text you specify. It displays the first item it finds, and opens the folder that contains the item to show the item in its native surroundings. You can find additional matching items with the Find Again command (also in the File menu).

The Find command has an exotic form as well. It lets you specify the type of search: by name, size, kind, label, date created, date modified, version, comments, or lock status. You can also specify exactly what you want matched (for example, a date) and how you want it matched (for example, look for items modified before that date). You can restrict the search to a single disk or to the active window. If you want, the Find command will even select all the items it finds at once in an outline view.

PERFORMANCE ISSUES

When I started using prerelease versions of System 7 last fall, I thought it would be too slow on a Mac Plus, SE, or Classic. In fact, System 7 isn't perceptibly slower overall than System 6 on my 2.5MB Mac Plus, and it is appreciably faster at a few things—such as copying files on my crowded hard drive.

Additionally, I worried that System 7 would devour too much memory and disk space. It turns out that the 2MB that System 7 requires is roughly equivalent to having 1MB with System 6. As a rule of thumb, figure you need 1MB more than you actively use now. (You may have to add more than 1MB, depending on your current RAM configuration.) The only people I would recommend not upgrade to System 7 are those who routinely use all of the memory in a 4MB Mac Plus, SE, or Classic. You also need a hard drive to use System 7, but that's hardly an odd requirement these days.

Aliases

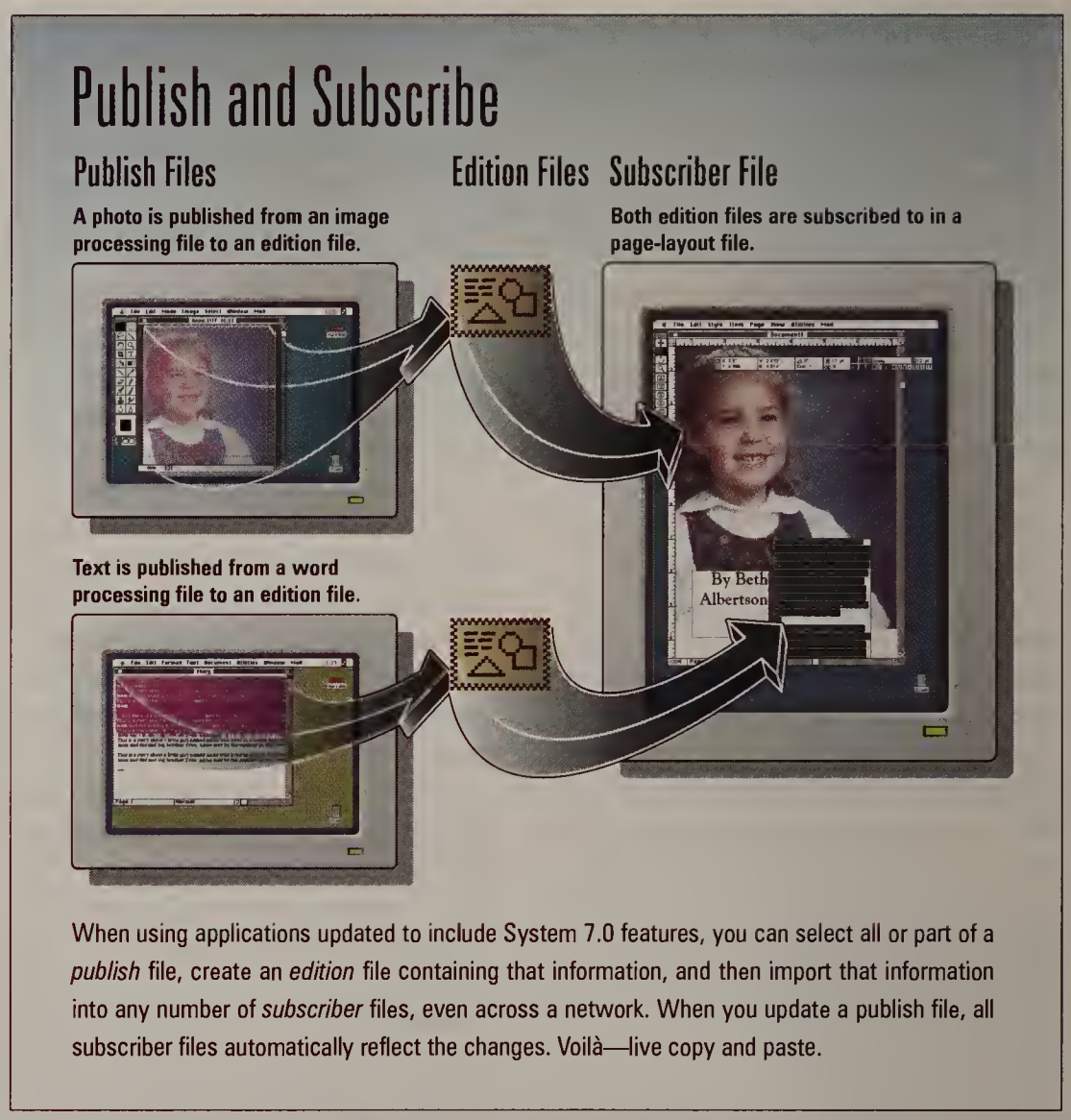
Although the new Find command is very fast, it doesn't take the place of well-organized disks. Enter the System 7 *alias,* chosen from the Make Alias command in the File menu. An alias of a program or document is essentially a stand-in for an original program or document that you can use as if it were the original. It's not a copy, but rather a small (1K to 3K) file that directs the computer to the original file.

You can open an alias, move it, or even drag items to it. In fact, an alias even looks exactly like the original item except its name is italicized and initially has the word *alias* at the end.

Aliases have a variety of uses, and you can read more about them in

"Getting Started with System 7." But just to whet your appetite, here are some things you can do with them.

- Open frequently used programs, documents, and folders from the desktop while the real items remain buried in nested folders.
- Add items to the Apple menu without moving the originals from their folders.
- Organize documents and folders according to multiple filing schemes without duplicating items.
- Simplify access to file servers and individual items on servers.
- Have nearly automatic access to your Mac's hard drive(s) using a floppy disk in any other Mac on the same network.



When using applications updated to include System 7.0 features, you can select all or part of a *publish* file, create an *edition* file containing that information, and then import that information into any number of *subscriber* files, even across a network. When you update a publish file, all subscriber files automatically reflect the changes. Voilà—live copy and paste.

Editing Icon Names

In Finder 7, clicking an icon no longer selects the name for editing. Instead, to select an item name for editing, you either click the icon and then press either the return or enter key, or click the name itself.

If you're an experienced Macintosh user, the new method of editing icon names is one of the toughest System 7 changes to get used to. On the good side, you can no longer accidentally, and perhaps unknowingly, rename a selected document or folder by bumping the keyboard.

More Finder Improvements

A number of improvements to the Finder give you more control over its windows. The most noticeable improvement is that windows scroll automatically if you drag an item or a group of selected items past the active area of the window. Dragging into a window corner scrolls diagonally.

Clicking the zoom box makes the active window just large enough (or small enough) to show all items in it. You can select multiple items by dragging over them in any view (not just Icon and Small Icon views). Items are highlighted one-by-one as you drag over them, not en masse when you stop dragging. And, you can change the order of items in a list view by clicking a column heading instead of using the View menu.

When you press the ⌘ key while clicking in the title bar of the active Finder window, a pop-up menu appears. The menu reveals the path through the folder structure from the active window to the disk. You can open any folder along the path by simply choosing it from the pop-up menu.

Multiple Programs Open The Application menu's icon at the right end of the menu bar tells you which program is active. The menu itself lists all currently open programs below the gray dividing line. Choosing a program makes it the active program. The first command hides (but doesn't quit) the active program and switches to another open program. The Hide Others command hides the windows of all open programs except the active program.

You can select an item in a Finder window or on the desktop without using the mouse. Typing an item's name or the first part of it selects the item. There are other keystroke combinations that select an item near the currently selected item, open the item, and more. The details are spelled out by the Finder Shortcuts command in Finder 7's Help menu.

When you drag an item from one Finder window to a folder in an overlapping window, Finder 7 keeps the destination folder in view. Older Finders bring the source window in front of an overlapping target window as soon as you begin dragging, possibly covering the destination folder.

If windows have become smarter, then the Trash has become dumber (and safer). Now the Trash is emp-

tied only when you choose the Empty Trash command from the Special menu. You can even shut down the Mac, and the Trash doesn't empty if there are files there. Unlike older Finders, Finder 7 does not fuss if you put application programs and System files into the Trash. It also lets you drag locked items to the Trash but won't delete them until you unlock them.

Finder 7 lets you classify folders, programs, and documents by labeling them with a word or phrase from the Label menu. The Label menu replaces the Color menu that appears on color Macs running older Finders; thus, on systems that are able to display colors or gray shades, labeling an item also colorizes it.

System Folder Renovation

Nothing mentioned so far helps you organize the king of clutter—your System Folder. Now preference files and control-panel and start-up documents are kept in special folders inside the System Folder. Moreover, Finder 7 is smart enough to place many of these files in the new Extensions, Control Panels, or Preferences folders when you drag them to the System Folder icon.

The old Control Panel desk accessory, like the System Folder, has become overcrowded and harder to use. In System 7, selections in the Control Panel are now separate control panels that you open like ordinary application programs. They are kept in a special Control Panels folder within the System Folder. For convenience, an alias of the Control Panels folder appears in the Apple menu so you can open the folder easily.

One problem that you may encounter is that some older preference files, control panel documents, and system extensions don't work correctly when you put them in the new Extensions, Control Panels, or Preferences folders. In those cases, you have to drag the items to the System Folder window (not to its icon) for them to work.

The Font/DA Mover is no longer necessary. You can open desk accessories just as you would regular application programs (by double-clicking the icon) or you can install DAs in the Apple menu by dragging them to the Apple Menu Items folder. To install fonts you drag their icons to the System Folder. Finder 7 puts fixed-size bitmap fonts and TrueType outline fonts in the System file for you.

If you open the System file (you can do that now), you see an icon for each installed font. Opening a font icon displays some sample text in that font. To remove a font, drag its icon to a folder or the desktop. You can install, inspect, and remove three other kinds of items in the same manner: system alert sounds (for use with the Sound control panel), keyboard layouts, and language system scripts.

Directory Dialog Improvements

The directory dialog boxes you get when you use Open and Save As commands from any program work more like a one-window Finder. As always, a single directory window lists the contents of a folder or disk alphabetically by name. Names longer than 25 characters now appear in the directory window in compressed-style text.

More important, directory dialog boxes provide a view of the desktop for the first time—you can open disks and other items on the desktop. In fact, opening a disk at the desktop level is the new method of switching disks (see "Desktop Access").

TrueType

Thanks to System 7's TrueType fonts, almost all programs display and print smooth text at any size. (The exceptions are programs that restrict your selection of text sizes.) TrueType fonts are variable-size outline fonts similar to the PostScript fonts that look so sharp on LaserWriters.

If you use large font sizes or have a printing device that uses screen fonts—an ImageWriter, fax modem, ink-jet printer, or PostScript-less laser printer—TrueType fonts will save disk space. Because TrueType fonts can be scaled to any size, you no longer need the double, triple, or quadruple fixed font sizes that eat up your hard drive.

You can still use old-style fonts, but, as always, they look good at their fixed sizes and lumpy when scaled to other sizes. You can intermingle TrueType fonts with the PostScript fonts used by LaserWriters and other PostScript devices. If a document being printed on a LaserWriter contains

SYSTEM 7 BOILED DOWN

On the whole, Apple engineers have succeeded admirably in making System 7's new capabilities available but not intrusive. The system software's look and feel has changed amazingly little considering that System 7 lets you do the following things:

- Access and organize stuff on disks faster and easier with a greatly improved and omnipresent Finder.
- Open several programs concurrently (memory permitting) and have unattended tasks done in the background while you continue working.
- Use disk space as if it were memory for opening programs and documents (though not on a Mac Plus, SE, Classic, LC, or Portable).
- Share files with other computers networked to your Macintosh.
- See sharp text at any size on any screen, printer, or other output device.
- Be cool, with color windows and icons (requires a color monitor).

All these capabilities are available with the programs you have now. With future upgrades to application programs, you can

- Remain proficient in a wider variety of programs and learn new ones more easily by using interactive help.
- Automatically update copied material in one document when the original material in another document (which can be on another Mac in your network) changes.
- Link programs to merge their capabilities.
- Get data from large databases on other computers with one simple menu command.

a TrueType font that has no PostScript equivalent, System 7 smoothly scales the TrueType font to the resolution of the output device.

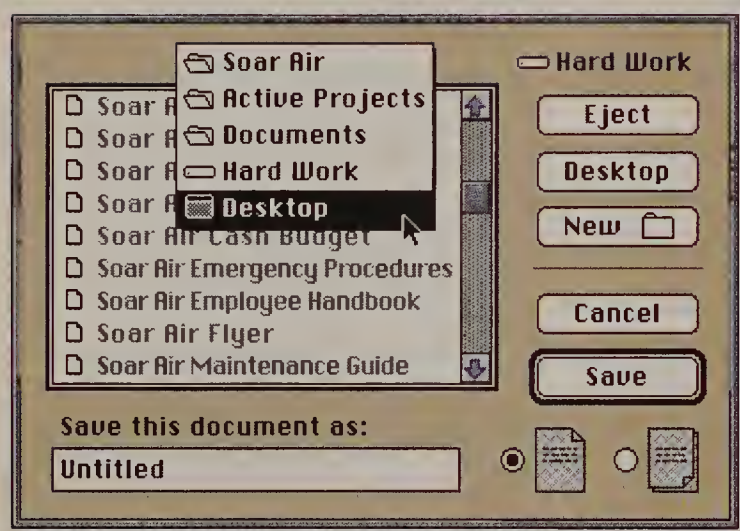
Extending Memory

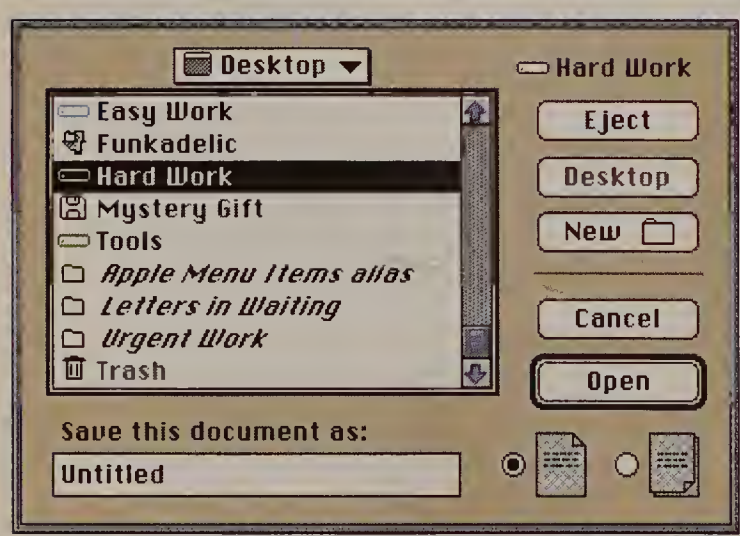
Less flashy than TrueType fonts but probably more important to your productivity are System 7's two means of letting you use more memory: 32-bit addressing and virtual memory. Not everyone will be able to use these options, however.

By using 32-bit addressing, some Macintosh models can access more RAM (random access memory). To turn 32-bit addressing on and off, you use the new Memory control panel. With 4MB RAM SIMMs installed, for example, turning on 32-bit addressing lets you use 10MB of RAM on an LC, 17MB on a IIsi, and 32MB on a IIci or IIfx. If 32-bit addressing is off, you can only use 8MB of RAM regardless of the amount installed.

Not all applications will be compatible with 32-bit addressing, however. Apple has been exhorting developers to make their products 32-bit clean for two years now, but not all have complied.

Unfortunately, Mac II, IIx, IIcx, and SE/30 models cannot use 32-bit addressing because their ROM (permanent read-only memory) chips are incompatible with it. Although those models have a replaceable ROM, Apple has no plans for making ROM upgrades available. Mac Classic, SE, Plus, and Portable models can't use 32-bit addressing because their 68000 central processing units don't support it.





Desktop Access In Open, Save As, and other directory dialog boxes, you get to the desktop level by choosing Desktop from the pop-up menu or by clicking the Desktop button (top). Then you can open a disk or other desktop item (bottom). Italicized file and folder names indicate alias copies (here the word *alias* was edited from two folder names).

Virtual Memory

You may be able to increase the amount of memory available on your Macintosh without installing more RAM. System 7 can transparently use part of a hard drive as additional memory. This extra memory, called virtual memory, lets you open more programs at once and increase the amount of memory each program gets when you open it.

However, virtual memory only works on a Macintosh equipped with a Paged Memory Management Unit (PMMU). The SE/30, IIcx, IIx, IIsi, IIci, and IIfx models all have PMMUs, and a Mac II can be retrofitted with one. An LC can be upgraded with an accelerator board containing a PMMU. However, a Mac Plus, SE, Classic, or Portable with such an accelerator can't use virtual memory because the ROM chips in those Macs lack some necessary information.

File Sharing

If your Mac sits on a network, System 7 lets you share hard drives, folders, and files with other networked users. You can access folders and drives on other Macs; likewise, users of other Macs (including those running System 6 with AppleShare client software) can access folders and drives on your Mac.

Before any of this is possible, however, you must use the new Sharing Setup control panel to configure your Mac as an AppleShare file server. Then, select either the drive or folder you want to share, and use the Finder's new Sharing command to display the item's sharing information window. There, you specify *access privileges,* that is, who can see the item's folders, see its files, and make changes to it. You identify registered users, set their passwords, and create groups of users with the new Users & Groups control panel.

To share another Mac's folder or drive, you use the Chooser. It lists as AppleShare file servers the names of all computers that are sharing their folders and drives. After you select one, the Chooser asks you to connect as a guest or a registered user, and then presents a list of items you may share.

Accessing someone else's folders or drives is considerably slower than accessing your own. Also, your computer's performance degrades markedly while others share your folders or drives.

A Macintosh should have at least 2.5MB of RAM if you want to open more than a single midsize program (say maybe a DA or two as well) while sharing folders or drives. Sharing items with others increases the system's memory usage by 250K to 300K. That leaves only about 600K for opening programs on a 2MB Mac.

Live Copy and Paste

Some programs use System 7 to let you share information *dynamically* among documents, which means that changing original information in a file automatically updates copies of it—whether that copy is on your Mac or on a networked Mac. Think of it as a live copy and paste.

To make information available for dynamic sharing, you *publish* an *edition* of it. You then include copies of the published information in a document by *subscribing* to the edition (see "Publish and Subscribe"). Only programs that include Edit menu commands for publishing and subscribing can dynamically share information. You won't find these com-

COMPATIBILITY REPORT

If you're like most Macintosh users, most of the software you already have will work with System 7. Some programs will have minor cosmetic flaws, others will acquire minor disabilities, and a few will break. The older and more obscure a piece of software is, the more likely it is to have serious problems, and the less likely it is to be upgraded for System 7. Although System 7 itself seems quite rugged, you should expect more system crashes using it than with System 6.0.5 until you upgrade your other software to versions made for System 7.

So that you don't have to crash test all your software, Apple will include with System 7 a HyperCard stack called Compatibility Checker. Using information Apple has compiled from developers, Compatibility Checker checks your application programs, desk accessories, system extensions, and control panels; lists their version numbers; and reports what is known about each item's compatibility with System 7. The checker notifies you if your version of a certain program doesn't work with System 7, or if your version is compatible but there is a more recent version. In either case, the Compatibility Checker gives you a phone number to call for an upgrade. If your version is compatible or its compatibility is unknown, the checker reports that too.

Programs can be compatible with System 7 and still lack the following four features: balloon help, live copy and paste (publish and subscribe), data access (DAM), and program linking. Software developers must upgrade their programs to take advantage of those features. Also, software must eventually be made 32-bit clean if it isn't already. Many companies have already announced upgrades or new products incorporating these features, including Andyne Computing, Articulate Systems, Claris, Deneba, Farallon, Interleaf, Microsoft, Pharos, RagTime, Softsync/BLOC, SuperMac, Symantec, and Symmetry. In addition, Bitstream, Kingsley/ATF, Linotype, and Monotype Typography-USA will be making TrueType fonts.

mands in the programs you have now, because software developers must upgrade their programs to include those commands.

Accessing Data

The programs you have now must also be upgraded to take advantage of System 7's Data Access Manager (DAM). DAM provides a simple method for getting data from a variety of large databases resident on host computers of all brands and sizes. You can usually recognize a program that supports DAM by the Open Query command in its File menu.

You use the Open Query command to open a *query document* that describes the type of data you want. A dialog box describes what you will get if you enter the information it requests and click a button to start the query. For example, it may ask you to enter your name and password and select a type of report. Behind the scenes the query document and DAM connect to the host computer, request the information using the arcane commands of the host database, obtain the information, and finally, paste it into your document.

Program Linking

System 7 paves the way for programs to work together. While you work in one program, you will be able to use the commands and tools of other programs made by different software vendors. For example, Claris's new version 2.5 of MacProject II uses Claris Resolves, a forthcoming spreadsheet program, to prepare graphs from tables of numbers.

Program collaboration relies on System 7's framework for information interchange, called AppleEvents, which lets any program send messages to other programs. System 7 stores AppleEvents messages sent to a closed program and forwards the messages when the program is next opened. It also dispatches messages across a network to programs on another Macintosh.

Getting Used to System 7

All these new features and capabilities may sound intimidating at first. Remember, though, that you can learn how to use most of them at your own pace. Take your time exploring the many Finder improvements. Wait to explore file sharing, virtual memory, and 32-bit addressing until you need them. Turn on balloon help only when you find it beneficial. Figure out publishing and subscribing (live copy and paste) and data access when you get updated programs that include them.

System 7 brings only a few changes you must face from the moment you begin using it. You can't dodge multitasking; you must get used to having multiple programs open at once. Also, longtime Macintosh users will have to learn a few new skills when editing icon names and using the standard directory dialog boxes for opening and saving items.

You upgrade to System 7 not for the changes it forces on you immediately, but for the possibilities it offers. Take your time. If you currently have only 1MB of RAM, wait to upgrade until you can afford to increase your Mac's memory (and get a hard drive, if you don't already have one), but do upgrade. As surely as 20MB hard drives have given way to 40MB hard drives, a year from now we will all think of System 7 capabilities as ordinary Macintosh capabilities. ■

Contributing editor ***Lon Poole*** *has reported on System 7 since Apple announced it two years ago. He switched to System 7 last fall and since then has used it on a variety of large and small Macs in preparation for this article and for his complete book on the subject,* Macworld Guide to System 7 *(IDG Books, 1991).*

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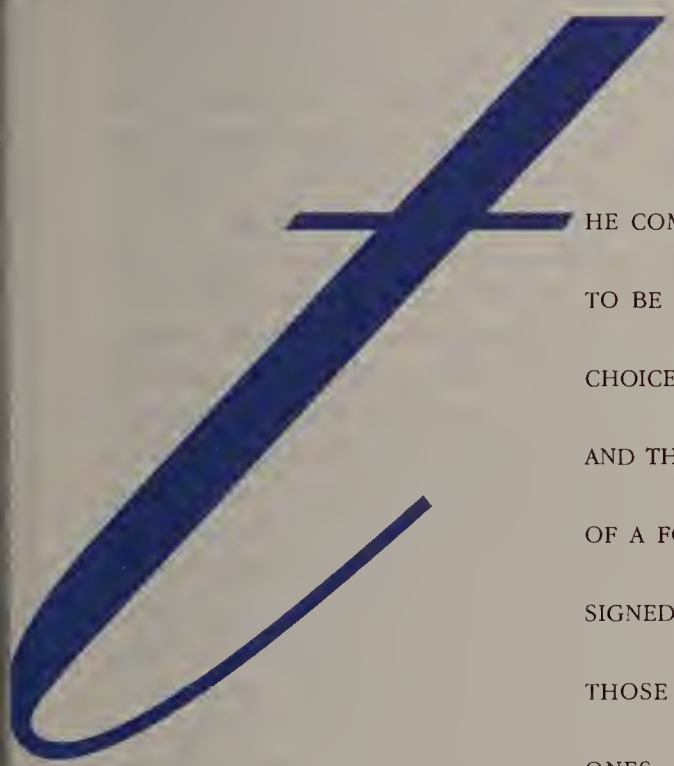
TYPE RENAISSANCE

A primer on digital type



THE COMING YEAR PROMISES TO BE FRAUGHT WITH NEW CHOICES IN THE USE OF TYPE, AND THIS IS THE BEGINNING OF A FOUR-PART SERIES DESIGNED TO HELP YOU MAKE THOSE CHOICES INFORMED ONES. THIS ARTICLE IS A PRIMER ON THE PRINCIPLES OF DIGITAL TYPOGRAPHY. IN THE SECOND ARTICLE, "DESKTOP FOUNDRY," WE WILL EVALUATE TODAY'S TOOLS FOR TYPE DESIGN. THE THIRD, "POSTSCRIPT VERSUS TRUETYPE," WILL COMPARE TWO KEY TYPE TECHNOLOGIES. THE FOURTH, "TOP-NOTCH TYPE," WILL BE A GUIDE TO ACHIEVING HIGH-QUALITY TYPOGRAPHY ON THE MAC.

BY ALEX BROWN

Innovations in typesetting have revolved around changes in the master images of characters, allowing us to harness new kinds of machines to reproduce type. In 1456, Johannes Gutenberg perfected a method for casting individual characters in metal, and handset type began its 400-year domination of publishing. Handsetting type, by assembling individual metal letters in lines, is a tedious business. Trained compositors might produce ¼ line a minute, and after printing, they must return every character to the typecase. With a cast letter as a type master, an enormous inventory of type is required to produce different sizes and type styles, and the proper fit of the letters is governed by their placement on metal type bodies. Handset type is inelastic, unchangeable, and requires intensive manual labor to set. Nevertheless, its introduction represented an exceptional advance over handwritten manuscripts of the prior 5000 years.

The next typesetting innovation occurred in 1886, when Ottmar Mergenthaler commercially introduced the Linotype, a machine that mechanized every aspect of composition, and introduced a keyboard as a means of control. The Linotype is a linecaster, a machine that is something of a self-contained foundry. The type

Photograph by Geof Kern

masters are matrices—molds from which type is cast, not the type itself (as in handset type). The matrices clatter down chutes in a huge storage case when corresponding letters are typed on the keyboard. After the compositor finishes a line, the row of matrices is drawn into a casting apparatus and filled with molten metal. After use, matrices are automatically sorted and returned to the storage case. By using a type master that is one step away from the end product, linecasting ended the age-old compositor's problem of running out of particular letters and the difficulty of distributing type after use. Above all, the machine made typesetting faster than it had been before. Good compositors can set seven lines per minute.

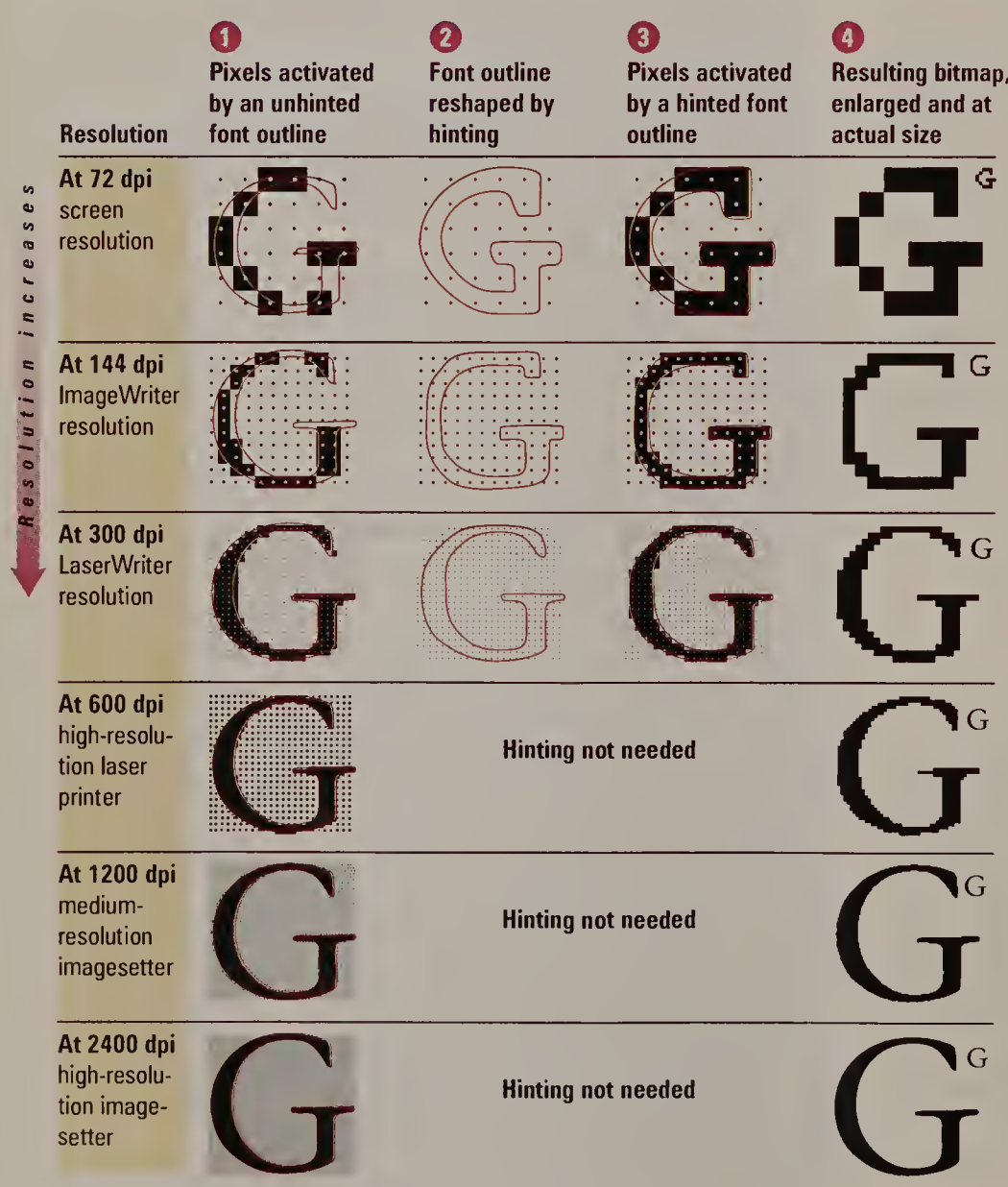
In 1949, Rene Higonnet and Louis Marius Moyroud demonstrated a machine that set type from photographic masters at the American Newspaper Publishers Association conference. Their machine, the Photon, went into commercial use in 1954, and the publishing industry began a slow but steady shift toward photocomposition. Instead of using metal type or matrices, photocomposition machines make type images by directing a stroboscopic lamp through a film master of the type design, exposing an image of the letters on light-sensitive paper. A lens enlarges the film master to different type sizes, and an escapement mechanism positions each character on the line. This system freed typesetting from the physical constraints of metal type; letters no longer had metal sides that fastidious handset compositors had to file away in order to ensure aesthetic letterfit. The white space around letters was under the typographer's control. Because they used light to make the type images, photocomposition machines were quite fast compared to all previous technologies, yielding 50 lines a minute, producing type faster than people could enter text.

The introduction of digital phototypesetters in 1972 changed typesetting yet again, and once more the type master led the revolution. Digital phototypesetters use a digital representation of the design as a master instead of an image on a piece of film. This means that letters can be retrieved many times faster than with nondigital typesetters—3000 lines can be set every minute, which amounts to a full magazine page in 15 seconds. Digital type masters never wear out, they are compact and portable, and they allow more sophisticated type manipulation than any of the previous typesetting technologies.

The first digital typesetters used an electron beam to write digitized letterforms onto a cathode ray tube (CRT). The type image on the CRT is then projected onto photosensitive paper, yielding output identical to that produced by photocomposition. After settling on digital storage of fonts, the typesetting industry then pursued more efficient output devices. The electron beam painting a CRT tube was eclipsed in sharpness by a laser beam generating an electrostatic charge on a drum. Toner particles are attracted to the charged areas and fused onto paper with heat. This eliminated photographic development of typeset galleys, and dry typesetting began.

In 1985, the introduction of PostScript brought digital typesetting to a vast new consumer market that had previously been unable to afford it. Typesetting itself moved downward

MAKING TYPE LEGIBLE



Scaling an outline font for display as a bitmap can distort the character's form, especially at low resolutions where only a few pixels are available to create the complex image. **1)** Pixels whose centers fall within the area defined by the character's outline are turned on. **2)** Hints are rules for adjusting the character's outlines to create the best possible image at low resolutions. **3)** Hints subtly alter the original outline so that selected pixels can be turned on. **4)** The result is that legible letters can be imaged at low resolutions. At higher resolutions the pixels are smaller; this means more of them fall in the outline, and they re-create the letterforms more accurately. The same letter imaged at 2400 dpi (imagesetter resolution) needs no hints to produce what appears to be an exact representation of the original outline.

from expensive, proprietary equipment used by newsrooms and commercial typesetters to inexpensive systems that were within the reach of individuals and small businesses. PostScript provided a way to obtain type and graphic images from a variety of output devices, ranging from high-resolution imagesetters to desktop laser printers.

The ABC's of Letters

While the technology used to set type has changed radically and with increasing speed, the alphabet itself has remained remarkably stable. The same letters you see emerging from a LaserWriter were originally drawn with pen and brush, or carved in stone or clay. The Romans contributed the root design for capitals, and medieval European scribes perfected the lowercase letters.

You're reading 9-point ITC Garamond Light right now, from a font family that you can purchase from Bitstream for less than $100. In fairness, you're a bit more than $100 away from producing pages like this, but page-layout applications for the Mac offer type management capabilities that in many ways exceed the control professional typesetters had through the 1960s.

The gap between this magazine page and your printed output is up to you. If you learn about typography, equip yourself with the proper applications, peripherals, and fonts, and have access to a high-resolution printer, you have the capability of composing text as professionally as any commercial typesetter. But be forewarned, typesetting is a difficult craft and can be an all-consuming passion. As Donald Knuth (see "Capturing the Designer's Intentions") remarked, "Now when I go into a restaurant, I spend the first five minutes staring at the type on the menu . . . only later do I notice what kinds of food they serve."

The most fundamental distinction between type styles is between serif and sans serif faces. A serif is the finishing stroke on the letters that you see in the Garamond that you are reading right now. A sans serif face, like the one in the bold subheads throughout this article, is one that lacks these finishing strokes. A closer examination of the details of each letter, and an understanding of the key elements common to all letters, is the next step in exploring typography (see "Illustrated Guide to Type"). A well-trained eye will allow you to identify hundreds of widely used typefaces and to recognize the distinctions of thousands more.

The Digital Domain

For the opening ceremony of the 1984 Los Angeles Olympics, the audience was, in effect, digitized. Each seat had a color flash card, and the

DESIGNING FOR A DIGITAL MEDIUM

Matthew Carter's career spans the entire development of digital typography. Currently vice president of design at Bitstream and an internationally recognized type designer, he has done everything from handcutting type for traditional letterpresses in Holland to designing typefaces for AT&T's U.S. telephone directories and *National Geographic*'s captions. In between he has designed type for phototypesetting equipment from Crosfield Electronics and the Mergenthaler Linotype Company.

DAVID BARRY

MATTHEW CARTER HAS DESIGNED TYPE FOR EVERYTHING FROM LETTERPRESSES TO LASERWRITERS.

Carter thinks that the main difference in designing for a digital medium is that the designer never really knows how the type is going to be used in the end. When a letter was cast in metal its design was frozen completely, and when type was set on proprietary phototypesetters, type designers had strict control over how their designs were implemented. But today, because digital type can be output on many different devices, at many resolutions, designers have no idea where their designs will end up, be it billboards or baseball bats.

Yet for all these new factors, Carter is emphatic about one central issue, "a high-end imagesetter is without question the best way of representing type that has ever existed. If you can't design type that looks good on those machines, you never could design type that would. It is the perfect way to image letters."

To Carter, technology is not now, and never has been, the determining factor in type design. "People do say that digital technology imposes itself upon letterforms. But it will only do this if the designer allows it to. If you were designing by hand and were incredibly lazy, you'd have bad design too. The fact is, with digital typography, you can really make any shape that you like. Technology can only show what you tell it to show. Good design is entirely the responsibility of the designer. If you set out today to design a font with current digital tools, it will be years in your professional progress before you discover things that you can't do. And then, they will undoubtedly deliver an upgrade."—L.W.

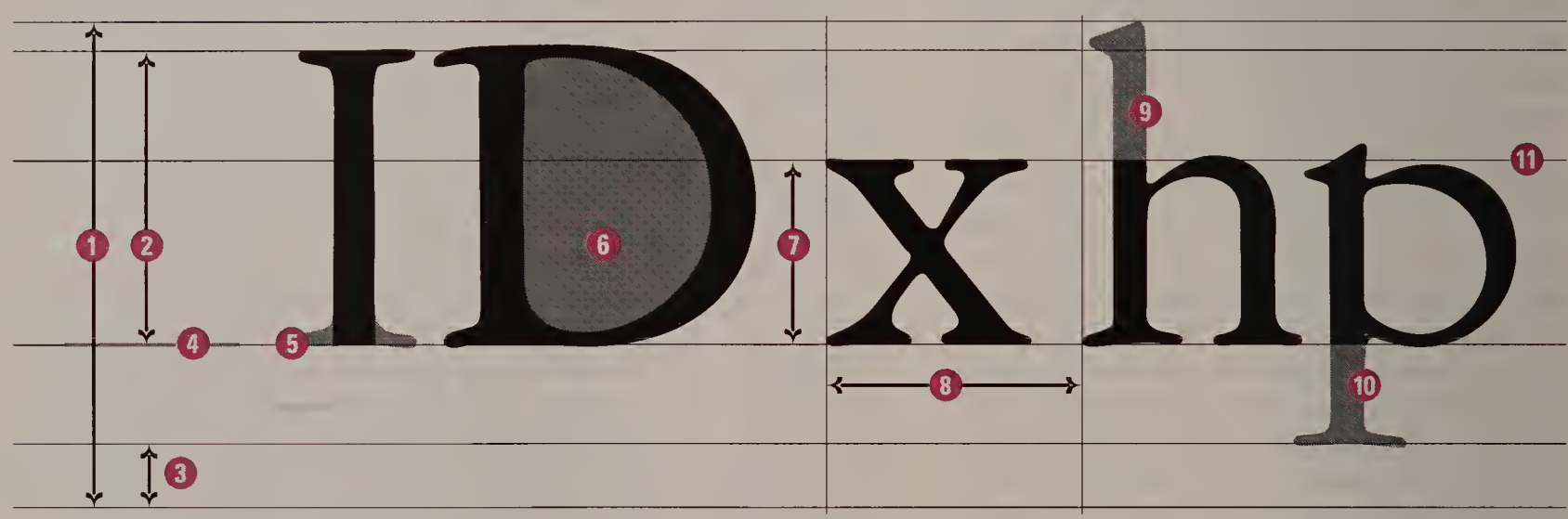
People say that digital technology imposes itself upon letterforms. But it will only do this if the designer allows it to.

spectators were instructed to hold up their cards on cue to form a pattern none of them could see, or form, alone. Given enough people to hold the cards, you can make pictures of flags, the Taj Mahal, or Garamond. This stadium full of people holding cards is much like a computer screen displaying black pixels and white pixels, or a printed black-and-white page. Individually, each bit signifies very little, but collectively they can create images of great subtlety and meaning.

These digital records of letter shapes can be stored compactly, preserved indefinitely, and represented on screens and printers flexibly. The simplest way to record a shape digitally is with a bitmap, a map of which screen pixels are turned on and which are turned off. Imagine the dots an extremely patient artist would draw if he or she marked every position on the line instead of drawing the line itself.

The Mac's display screen is a CRT that emits light when its phosphorescent surface is bombarded by a beam of electrons. The beam itself scans the surface line-by-line and is turned on or off at precise intervals, creating picture elements, or pixels, on the line currently being scanned. What the beam writes are pixels, and the line-by-line writing process is called raster scanning. A bitmap is the image a printer puts

ILLUSTRATED GUIDE TO TYPE



12 IDxhp 13 IDxhp 14 *IDxhp* 15 IDxhp

1 **Point size** A measurement of height, from the top of the *ascender* to a fixed depth below the *descender*. There are 72 points in an inch, so 36-point type occupies about 1/2 inch, including the shoulder.

2 **Cap height** A measure of height, from the *baseline* to the top of a capital character. The highest swell in curved characters can reach past this height.

3 **Shoulder** The fixed space below the *descender*. This ensures that the descenders from a line of type don't contact *ascenders* and capitals on the line just below when no leading, or space between the lines, has been added.

4 **Baseline** An imaginary horizontal line on which the base of every letter aligns. *Descenders* fall below it, and the deepest swell in curved letters overhangs it slightly.

5 **Serif** A small finishing stroke, roughly perpendicular to the main stroke of a character. The presence or absence of serifs is a major type classification.

6 **Counter** The white area enclosed by the curves or lines of a character, like the holes in a *D*, e, or *B*.

7 **x-height** The height of lowercase characters without *ascenders* or *descenders*, such as the *x* or e. Every letter occupies this minimum depth, making x-height the most visually significant dimension in a type design.

8 **Set width** The total horizontal white space that a character occupies. Additional space is added before or after the character and determines the default letterspacing.

9 **Ascender** The portion of a lowercase character that extends above the *mean line*. It may be quite tall relative to *x-height*, or very shallow.

10 **Descender** The portion of a lowercase character that falls below the *baseline*. Usually much shallower than the height of an *ascender*.

11 **Mean line** An imaginary horizontal line that falls along the top of lowercase letters without ascenders to define the top of x-height.

12 **Roman** Type that is not *italic* or *bold*; often called regular. The root design in a type family is roman, and the family may be extended with weight and width variants.

13 **Boldface** A heavyweight version of a type design, in which all strokes are thickened. The contrast between thick and thin strokes is often greater in bold than in *roman*.

14 **Italic** Type that slants, and is generally lighter in weight than the *roman* within the same family. Almost always very different in design from the roman.

15 **Sans serif** A type design without *serifs*, often with nearly uniform line weight.

on paper, as the printer's rasterizer specifies which dots within the page's grid are on (black) or off (white).

Bitmaps conveniently describe the final images that both screens and printers produce but present some problems. The Mac's display consists of 72 dots per inch, while the LaserWriter has a hearty 300 dpi, and a high-resolution output device, necessary for professional typesetting, offers well over 1000-dpi resolution. If your type masters are bitmaps, you need a different set for each output device. What's more, you would need different bitmaps for every size of type, since a bitmap records the specific dot array necessary to compose a shape, and so cannot be resized with good results. In fact, many early Macintosh fonts are exactly that, specific bitmaps designed for particular sizes and styles. Until the introduction of Adobe's ATM (Adobe Type Manager) technology, the Mac needed screen fonts that were hand-tweaked bitmaps to draw legible characters on screen.

Outlining the Advantages

Instead of packing hard drives and printers with bitmaps, though, current digital font technology is based on mathematical descriptions of the outlines of letterforms. Outlines describe font data with greater economy than bitmaps do and rely on an interpreter's calculations to create the bitmaps you ultimately need, at the highest possible resolution for the output device you use. Instead of recording which pixels must be turned on and off to create the whole letter, as a bitmap does, an outline describes only the boundary of each letter and does so with a mathematical formula. The outline formula is then mathematically manipulated (or scaled) to create an outline of the letter at the requested point size. The pixels whose centers fall inside this outline boundary are identified and activated (or turned on), creating the bitmap necessary for printing or display. At least, that is the idea. In fact, there are all sorts of challenges associated with deciding which pixels fall on or off a scaled outline (see "Making Type Legible").

Representing a letterform by the mathematical description of its outline solves several important technical problems. First, the outline eliminates a host of redundant information by ignoring the black interior of a letter, concerning itself only with describing the boundary of the shape. Second, the description is compact and easy to manipulate mathematically. And since the computer understands the letter as a mathematical formula, changing a letter's size, or skewing, slanting, and rotating it, becomes possible through a simple series of numeric calculations. Third, the type designer doesn't have to know in advance which kinds of output

CAPTURING THE DESIGNER'S INTENTIONS

When Donald E. Knuth, professor of The Art of Computer Programming at Stanford University and author of three volumes (so far) of *The Art of Computer Programming* (Addison-Wesley), decided to create a computer language to describe digital type, he had no idea that it would become a nine-year project.

DAN ESCOBAR

DONALD E. KNUTH'S METAFONT IS THE FIRST COMPUTER LANGUAGE TO DESCRIBE THE UNDERLYING PRINCIPLES OF FONT DESIGN.

His initial work on digitizing fonts took place at Xerox PARC (where John Warnock was also hard at work developing PostScript). What Knuth had imagined as a simple task, digitizing fonts, turned out to be a difficult one. He ended up trying to digitize fonts with a TV camera and a primitive frame grabber.

Then he took 35mm slides of the font, projected them on his living room wall, held a piece of paper to the wall, and traced the letters. Again, the resulting outlines were fuzzy and he got poor data.

"Then it occurred to me," continued Knuth, "that these letters were designed by people with ideas . . . what I wanted to do was somehow state the intelligence of what font designers were doing, and find a way to describe it digitally. It would be neat to have a language for graphics where you would state how you were drawing something. It would be a tool for designers rather than a tool for copying things."

Metafont, a computer language for creating fonts, was the product of that search. By generalizing the underlying principles of a font, it allows designers to go beyond creating a single font. Instead, they specify the form of the letters in Metafont, modifying them with parameters, numeric variables that change the generalized shape in a particular way. A designer can create an entire family of fonts with an infinite number of variations.

"I knew that digital typography was going to be big when it hit the world back in the late 1970s," recalled Knuth. "We had one of four Xerox XGP low-resolution graphics printers at the Artificial Intelligence Lab at Stanford University . . . when the XGP was broken, half the parking lot would be empty."—L.W.

I wanted to somehow state the intelligence of what font designers were doing.

Note: Metafont is in the public domain and is available from the TEX user group, box 9506, Providence, RI 02940.

devices will be used to print the type. Because the outline has no relationship to the ultimate point size produced, it is scaled when printed, outputting type at any size on any output device (see "Making Type Legible").

It's Open to Interpretation

The key to this elegant system of outline fonts is the interpreter, a complex program that does the mathematical calculations necessary to scale type, developing the bitmaps necessary for a particular device, using the same outline master for all resolutions and environments. Interestingly, the interpreter can be based in the printer or in the computer's operating system, or it can be a special application of its own. I've seen all these sources used, and it's not surprising that vendors are still shuffling this deck, looking for the most elegant solution.

PostScript is the best-known interpreter. A printer with a PostScript raster image processor (RIP) converts font outlines in the printer's memory to bitmaps. (PostScript-compatible printers usually also locate the interpreter in the printer.) The Mac's current operating system (6.0X) uses QuickDraw, a set of graphics commands and routines, to display fonts on the screen. However, QuickDraw wasn't designed for the full range of interpreter chores, and it is limited to rousting out the bitmaps stored in the System Folder as screen fonts, and scaling them, if need be, to different point sizes. QuickDraw can also derive bold, oblique, and shadow/outline styles for the stored fonts.

The same letters you see emerging from a LaserWriter were originally drawn with pen and brush, or carved in tablets made of stone or clay

Another approach to interpreting outlines is embodied in Adobe's ATM, a subset of the PostScript interpreter that runs on the Mac instead of in the printer. This software goes off to the printer font outlines to produce smooth bitmaps in any point size and then supplies those bitmaps to QuickDraw and the Mac's Font Manager.

Apple's TrueType, available as an INIT for System 6.0.7 and built into System 7.0, promises a major turn for font technology. TrueType endows the Mac's system software with an interpreter and locates most of the necessary decoding information within the font description itself. In theory, this approach ensures that key aspects of font-imaging technology can evolve independently of printers or screens. In TrueType, the Mac is pressed into service to carry out instructions that a printer's CPU once performed. The most appealing benefit here is that every dime you invest in upgrading your Mac has the potential to improve your type display and output speed.

Theory into Practice

The Mac has always offered an advantage over character-based display systems in the integration of graphics and text in documents because it displays screen images from bitmaps—the underlying model for all digital imaging. Even better, its management of type makes most of the essential work—communication between the application, system software, and output device—invisible to the user.

When an application accepts your keystrokes, it looks to a font metrics table to see how much horizontal space the letter you've chosen occupies on the line. It uses this width information to position the characters in that line of type and to determine where to break the line. At the same time, a screen representation of the character is called up or scaled on the fly to represent that letter on screen. If you're using Adobe's ATM, its interpreter builds the bitmap from the same outline master used by the printer. Without such an interpreter (under System 6.0X and before), the Mac fetches a specific bitmap—one of the screen fonts you've loaded with Font/DA Mover. If the exact size you want isn't available, the system scales an existing screen font to size, often with clunky, chunky results. With System 7.0 or the TrueType INIT, the Mac produces display bitmaps from the same outlines the printer will eventually use, in a process similar to the way ATM prepares them.

When you are ready to print a page, the application you are using, working together with the printer driver you've selected using the Chooser, converts the commands you've given your application into the page-description language that the printer uses to image pages. If you've chosen a PostScript printer, for instance, your document is translated into PostScript syntax. Then the printer constructs an image of the page in memory. Within the stream of PostScript commands headed from the Mac are instructions for the placement of text, images, lines, and other graphic elements. The application uses width information embedded within the fonts to display text, while the PostScript printer constructs font bitmaps according to the outline font data stored in its ROM chips or downloaded to its RAM.

This communication between the Mac Operating System, the application program, and the

printer allows a system in which you can mix and match printers, applications, systems, and fonts freely.

New developments, from Adobe, Apple, and others, promise improvements in digital typography that will both expand our control of type and return to us the aesthetic refinements that were lost when handset composition became impractical.

Adobe's Multiple Masters approach provides two or more outline masters to define a character. When a light and an extrabold version of the letter are both provided, users can summon type weights that fall anywhere between the two masters, obtaining medium, demibold, or any weight they wish from a single font. A font including four masters can provide a spectrum of weights plus the range of widths between expanded and condensed.

Fine type designers have always known that the huge difference in size between 8-point text and 72-point headlines calls for different designs in the characters themselves. When type was cast in metal, these adjustments were made as a matter of course, but when phototypesetting was introduced, few vendors offered the multiple film masters necessary to maintain distinctions among type sizes, and fewer users bought them. Instead, it became common practice to use a single master and rely on the phototypesetter's lens to create the various point sizes needed. Scaling type from a single master, however, is not the best solution since that fattens a letter as much as it increases its height.

Until now, digital type imaging relied on single outline masters. TrueType technology will permit subtle scaling changes to preserve character stroke weights during enlargement. Adobe's Multiple Masters will offer specific differences in master outlines, plus the ability to alter x-height and other character attributes.

Digital type is inexpensive, widely available, and easy to use, and it has the capacity to fulfill some of the highest aesthetic goals we have, and have ever had, for type. Drawbacks of digital type will continue to challenge font designers and typographers to refine their work for this new, and still evolving, medium. And they will be the more eager to do so because in you their innovations have a large, watchful, and appreciative audience. In fact, you are not only watching this revolution, you are making it. ■

Alex Brown *is the author of* In Print: Text and Type *(Watson-Guptill Publications, 1989), and is a consultant to magazine publishers. She believes she was born at exactly the right time, because she set type conventionally just long enough to dream of the Macintosh before it arrived.*

INVENTING POSTSCRIPT

If any name is synonymous with digital typography, it is John Warnock. Chairman and CEO of Adobe Systems, Warnock has been at the center of virtually every significant type development since 1985, when PostScript was released on Apple's LaserWriter.

When he worked at Xerox Parc (1978–1982) it was widely believed that building high-quality bitmaps for low-resolution devices was impossible.

DAN ESCOBAR

JOHN WARNOCK'S PIONEERING WORK ON POSTSCRIPT BROUGHT TYPOGRAPHY TO THE DESKTOP

But when he left and formed Adobe with Chuck Geschke, Bill Paxton, and Doug Brotz, finding a way to do it became a business necessity. Their pioneering work developed the techniques that PostScript uses to build bitmaps at a wide variety of output resolutions.

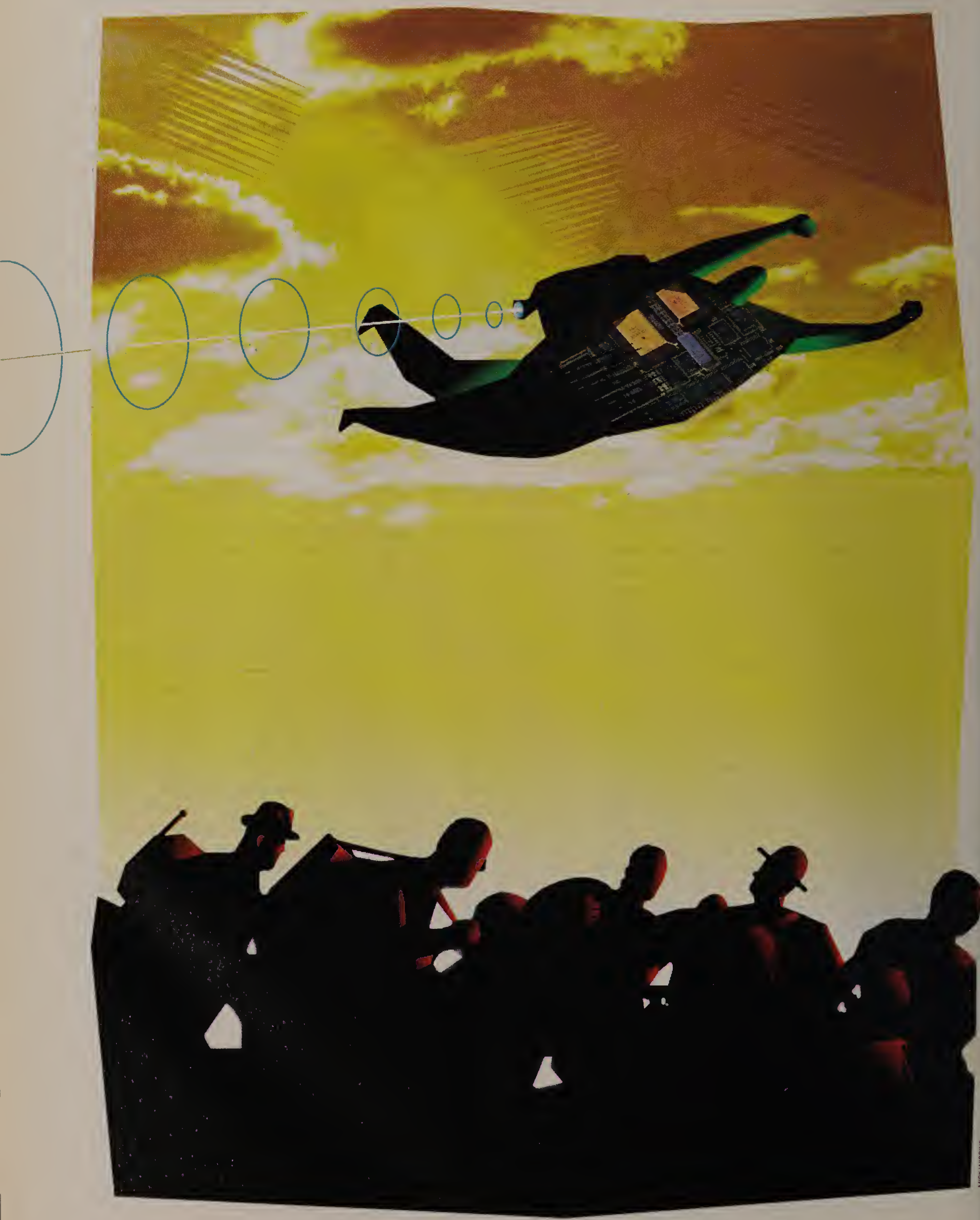
Warnock remembered that, at first, it was difficult, if not hopeless, to capture high-quality font outlines from printed sources. "We even," he remembers, "employed some of our kids for the early digitizing. I digitized the first alphabet myself. Those were hopelessly primitive attempts. We'd get the typeset masters, put them on enlarging copy machines, and then trace around these copies with digitizing tablets. We had terrible outlines to work with at first."

Creating good type, they learned, only got harder as their eyes, and sense of design, became more discriminating. Eventually, they hired designer Sumner Stone to help make their fonts correct typographically.

"One of the big problems with inventing typographic technology," Warnock says, "is that if you don't understand the cultural and subtle design aspects of typography, you can't do a good job. We've tried very hard to combine the art, the craft, and the science of type at Adobe.

"At first," he recalled, "it looked like a simple, straightforward technical problem; it is only after several years that you begin to appreciate the subtlety and difficulty of what you're dealing with. I know 10,000 times more about type now than I did in 1982, and I'm still learning. There is no precise mathematical description of type, only a cultural definition. It is part of the fabric of the culture."—L.W.

There is no precise mathematical description of type, only a cultural definition. It is part of the fabric of the culture.



MICK WIGGINS

to help you determine whether you should upgrade or trade

The Accelerated Course

SOONER OR LATER your Macintosh may seem like it has slowed down a notch. It could be that you caught a glimpse of a flashy Mac IIfx, or maybe you're just more impatient. Innocently enough, you start rationalizing the need for a faster Mac. This state of mind progresses to a point where you find yourself using the P-word: "A faster computer would increase my *productivity* by reducing the time spent waiting for time-consuming calculations." "Not only would my *productivity* improve, quality would improve because I could experiment more freely." ❖ Yeah, right. Remember the first time you sat down in front of a Mac II after using a Plus or SE for several months? As application windows blasted into view, were you thinking "Ooh,

BY ADRIAN MELLO

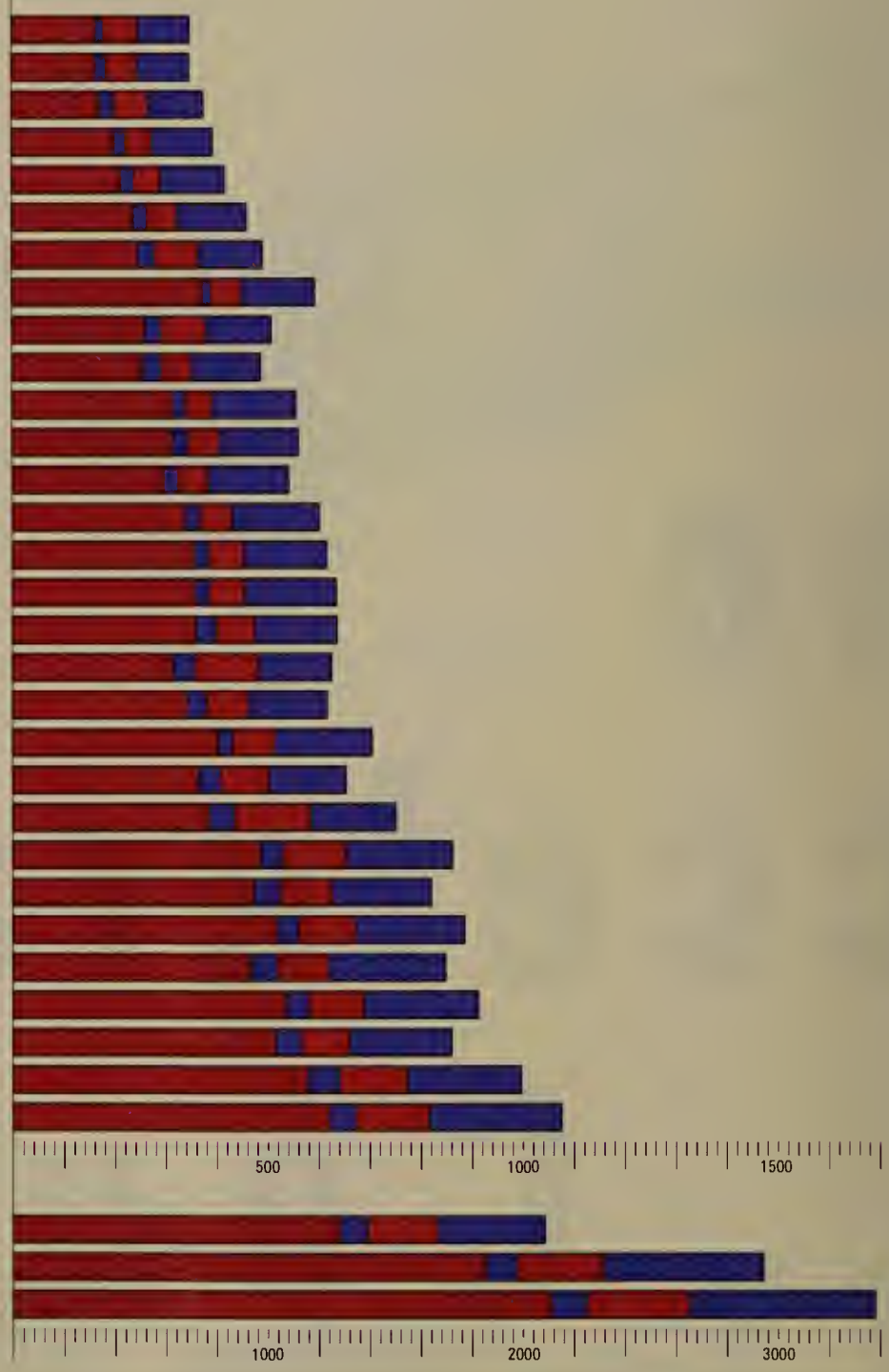
Speed Tests

All times in seconds; accelerators ranked fastest to slowest in overall performance

*Total Systems has replaced the 25MHz Gemini accelerator with a Gemini II–series accelerator that has the same specifications but comes only as a 68030-based product.

Processor-Intensive Tasks

Processor-intensive tasks show what an accelerator can do when much of the overhead associated with disk access and screen redraw is eliminated. We tested the accelerators performing such processor-intensive operations as redrawing a graphics file, grouping objects in a graphics file, performing a find and replace in a Word file, and sorting databases.



	Graphics redraw and fit in window	Claris CAD grouping	Font change and find/replace	Database sort
Siclone Intensifier ci (50MHz)	163	21	61	98
Apple Macintosh IIfx	167	22	58	101
DayStar PowerCache IIci (50MHz)	174	26	69	107
DayStar PowerCard 030 (50MHz)	197	24	52	118
Siclone Si3050/Total Systems Voyager 030 (50MHz)	212	27	56	122
DayStar PowerCard 030 (40MHz)	238	28	59	131
Micron Xceed IIci	249	31	86	127
NewLife Computer NewLife 33 (33MHz)	373	21	60	144
UR Micro MacCache-LP	262	32	88	128
Siclone Si3033/Total Systems Voyager 030 (33MHz)	260	32	64	133
MacProducts 030 RailGun (33MHz)	319	24	54	160
Novy Quik30 (33MHz)	319	24	64	156
Total Systems Gemini II (40MHz)	298	28	60	156
Total Systems Gemini (25MHz)*	339	30	64	170
NewLife Computer NewLife 25 (25MHz)	359	27	71	161
MacProducts 030 RailGun (25MHz)	359	27	71	180
DayStar PowerCard 030 (25MHz)	363	38	76	161
Apple Macintosh IIci	319	42	122	144
Dove Marathon 030 (32MHz) SE/30	344	40	82	150
Novy Quik30 (25MHz)	403	31	83	187
Dove Marathon 030 (32MHz) Mac II	367	44	88	154
Apple Macintosh IIsi	386	52	148	165
Radius Accelerator 25 (25MHz)	489	42	123	208
Apple Macintosh SE/30	472	50	103	192
Dove Marathon 020 (16MHz)	521	40	111	212
Apple Macintosh IIcx	469	52	102	224
Novy Quik30 (16MHz)	539	41	109	225
Mobius Accelerator (25MHz)	515	52	93	201
Apple Macintosh II	578	64	130	224
Radius Accelerator 16 (16MHz)	621	51	144	257
SLOWER MACHINES				
Dove Marathon 030 (16MHz) SE	1281	108	274	416
Apple Macintosh SE and Classic	1847	121	334	639
Apple Macintosh Plus	2120	139	404	727

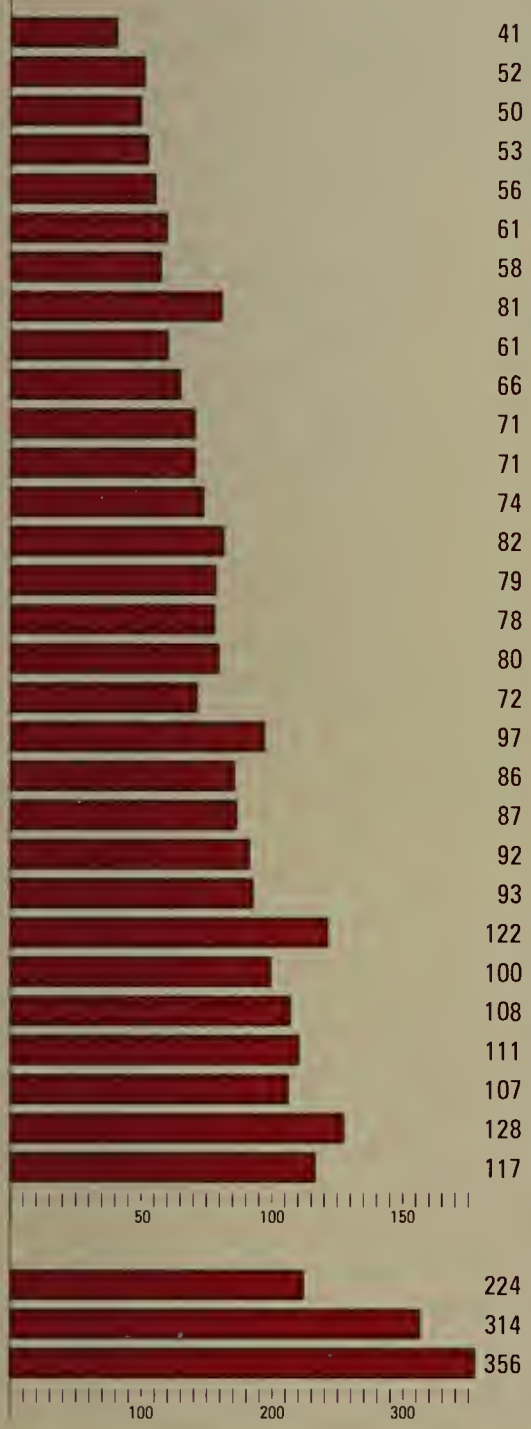
improved productivity"? Not likely.

Don't apologize for wanting a faster computer; accept your lust for speed. Consider upgrading the Mac with an accelerator board or with an Apple logic board. Basically, either type of board boosts a Mac's performance by replacing the processor already installed in the Mac with a faster one. If you own an older Mac such as a Plus, you might even consider selling it and purchasing a faster Mac, either new or used.

To help you wade through all the choices, Macworld Lab tested 27 accelerator boards to find out which ones were fastest at performing a variety of common operations (see "Speed Tests"). We also tested the different models of Macs to see how their raw speed compares to that of accelerated Macs. Most of the accelerators we tested use the Motorola 68030 processor, which is found in higher-end Macs such as the IIfx. The odd men out were the Dove Marathon 020, the Radius Accelerator 16, and the Radius Accelerator 25, which use the slower Motorola 68020 (found in the Mac II and LC). Although other 68020 accelerators exist, we tested these popular products only in order to compare their performance to the more up-to-date 68030 accelerators. We didn't test any 68000-based accelerators, since we feel that they don't provide a reasonable price-to-performance ratio. And the recently announced 68040 upgrades were not yet

Video-Intensive Tasks

The speed of many tasks depends on how fast the screen redraws as well as on how fast the processor runs. Scrolling is a prime example of a video-intensive task. Here we timed PageMaker, Excel, and Word in scrolling and averaged the results.

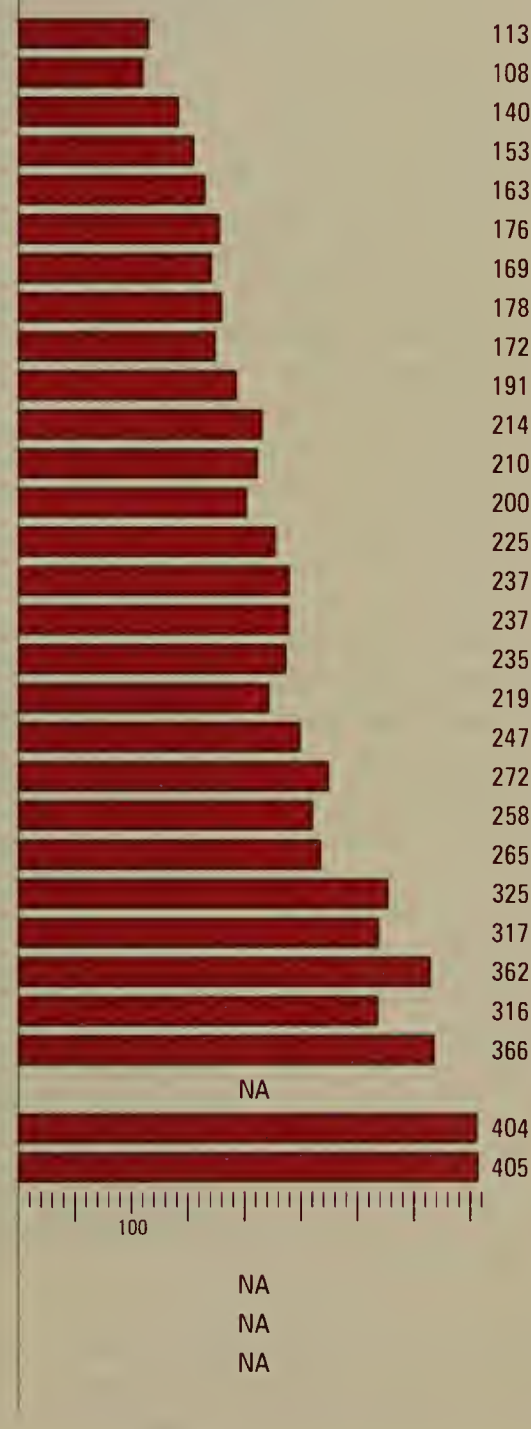


Disk-Access-Intensive Tasks

Here we timed the accelerators for opening PageMaker, Excel, ModelShop, ClarisCAD, and Word; for saving PageMaker, Excel, and Word; and for compiling Think C and MPW Pascal. These tasks are all highly dependent on disk access. We averaged the results for all these tasks.

Math-Intensive Tasks

Math-intensive tasks, such as recalculating an Excel spreadsheet and running a calculation in Mathematica, require the use of a floating-point unit (FPU) on the accelerator. The Macs and accelerators with an NA instead of a bar (below) don't support an FPU and so could not run the Mathematica version we used.



available at test time (see "The Motorola 68040: The Mac's Next Brain").

The accelerators we tested are available only for the Plus, SE, SE/30, and the discontinued models of the Mac II series (II, IIx, and IIcx). We also tested a few cache boards for the IIci, and one of them transformed a IIci into the fastest Mac we've ever tested. No accelerators were available for the Classic, LC, IIsi, IIfx, and the Portable at test time. However, DayStar Digital, Dove, Mobius, NewLife, Novy Systems, MacProducts USA, and Total Systems will soon ship accelerators for the LC, IIsi, and Classic. We didn't forget vintage Macs such as the 128K, 512K, and 512KE, but we decided not to test accelerators for these models because it doesn't make good economic sense to upgrade them.

Processors and Speed

Be forewarned that an accelerator containing the same processor as the Mac IIci may not make a Mac Plus's overall performance equal to that of the IIci. For overall excellent performance, the Mac needs to have a balanced hardware design. The amount of memory, the speed of the hard drive, and the bus configuration all play important roles in system performance. For instance, the Mac Plus, SE, and Classic use comparatively slow SCSI ports. Reading data from and writing data to a hard drive remain relatively slow on these Macs if you

THE MOTOROLA 68040: THE MAC'S NEXT BRAIN

Closing in on the horizon are accelerators based on the Motorola 68040—the latest member of the 68000 family, on which all Macs are based. Apple will ship a system based on the 68040 as soon as the chip is available in sufficient quantities to meet customer demand. The 68040 will initially be available in only a 25MHz version. When compared with a 50MHz 68030, a 25MHz 68040 is one and one-half to two times as fast in basic integer performance and about five times as fast in floating-point performance. Mac applications overwhelmingly depend on integer performance for most calculations. The performance gains are the result of a number of improvements, including much larger data and instruction caches and a higher degree of integration. One difference between the 68040 and its predecessor, the 68030, is that the 68040 incorporates floating-point operations.

A few vendors have announced accelerators based on the 68040. Total Systems plans to offer the Magellan line of 68040 accelerators. Fusion Data Systems has announced the TokaMac 68040 accelerators for the Macintosh LC, IIsi, IIci, and SE/30. Novy, IIR, MacProducts, and Siclone told us that they are working on 68040 accelerators. One particularly interesting announcement is the Radius Rocket—a 68040 accelerator on a NuBus board. The Rocket's 68040 will not replace the processor on a Macintosh II–series machine but will permit applications to divide processing tasks between the Macintosh II's original processor and the 68040 on the Rocket. The Rocket is also equipped with a processor direct slot that could potentially be used to hold piggybacked expansion boards specialized to accelerate options such as SCSI transfers, image compression, and rendering.

Not all vendors plan to develop 68040 accelerators immediately. DayStar, for example, believes that moving to the 68040 will be challenging, since some applications may have compatibility problems with the 68040's new features—memory management, exception handling, and floating-point operations. The company also believes that for most users the 25MHz 68040 will not provide a significant performance improvement over a IIfx because most Macintosh users don't rely heavily on floating-point calculations. DayStar will await Apple's introduction of a machine based on a 68040, which will lead the developer community to solve compatibility problems.

However these issues prove out, you should expect to pay a premium price for a 68040 accelerator, at least for a while. Thus, you will still get the best price-to-performance value with a 68030 accelerator.

add an accelerator that does not include an option for a faster SCSI port.

Still, raw computing power eventually comes down to the type and speed of the Mac's processor. The Mac Plus, SE, and Classic all use the comparatively slow 68000 processor. The performance of these machines can be improved, often dramatically, by adding an accelerator with a faster 68020 or 68030 processor. Similarly, the 68020-based Mac II's speed can be noticeably improved by adding a 68030.

The speed difference can be attributed to the improvements Motorola has made in each chip's design. Unlike the original 68000, the 68020 and 68030 processors include a 256-byte cache that stores frequently used instructions. Since the 68020 and 68030 retrieve these instructions from the cache rather than from slower main memory on the logic board, these processors gain a speed advantage over the 68000. The 68030 ups the ante over the 68020 by including a second cache for frequently used data. Additionally, the 68030 is more efficient at processing instructions than the 68020 is.

The 68030 also includes memory-management capabilities required for advanced System 7.0 features such as 32-bit addressing and virtual memory. (A less expensive version of the 68030—the 68EC030—does not include memory-management features. One model of the Mobius 030 Accelerator uses this chip.) Keep in mind that even though an accelerator—or certain models of the Macintosh, for that matter—provides a 68030, you won't necessarily be able to take advantage of these features (see "Keeping Current" in this issue). For this reason many accelerators come with Virtual, a utility from Connectix that gives the Mac virtual memory capabilities even without System 7.0.

Faster Than a IIfx

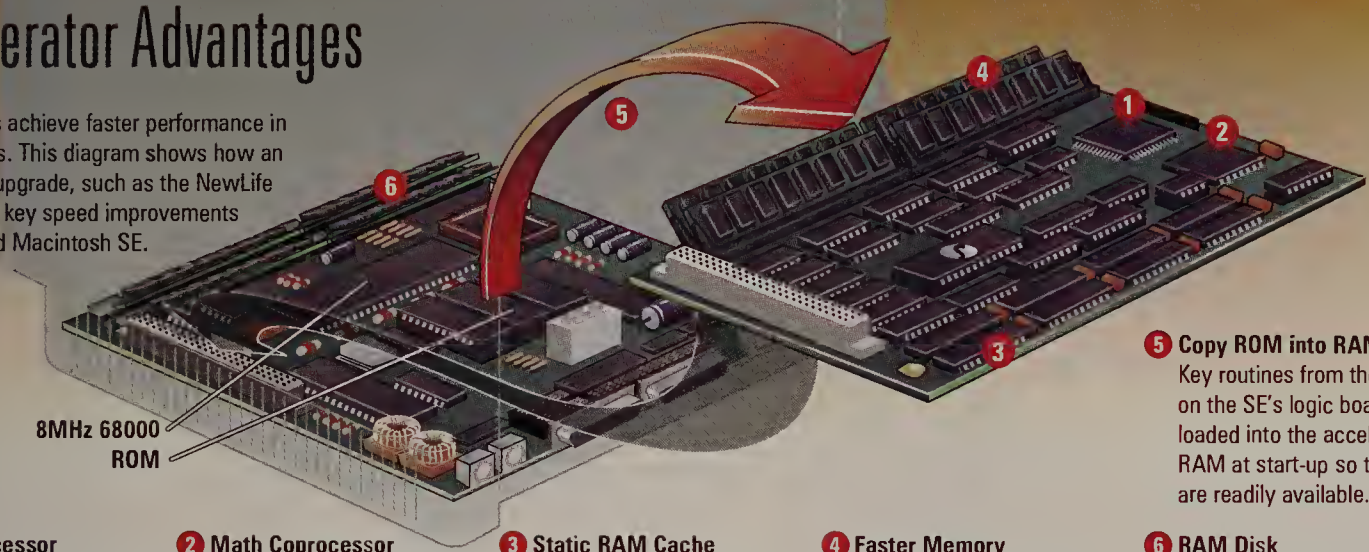
Since its introduction, the Mac IIfx has been the computer against which all other Macintosh models and accelerators are measured. The IIfx, however, uses a 68030 processor as does the Mac IIx, IIcx, IIci, IIsi, IIfx, and the SE/30. So how do you explain performance differences between these machines? Differences occur because the 68030 comes in different *clock speeds*. (Clock speeds are measured in megahertz.) The higher the clock speed, the more information the processor can handle at once.

In general, our test results show that an accelerator that uses a 40MHz 68030 (the processor found in the Mac IIfx) outperforms an accelerator that uses a 25MHz 68030 (found in the Mac IIci). Of course, you pay for those extra hertz. For example, the 50MHz Siclone Si3050 lists for $2499 while the 33MHz Siclone Si3033 costs $1799—that's $700 more for the faster accelerator.

Some vendors provide accelerators with a 50MHz 68030. However, this alone doesn't guarantee that a board will make a Mac faster than (or

Accelerator Advantages

Accelerators achieve faster performance in several ways. This diagram shows how an accelerator upgrade, such as the NewLife 33, provides key speed improvements to a standard Macintosh SE.



1 Faster Processor
The NewLife's 33MHz 68030 chip is faster than the SE's 8MHz 68000, partly because the 68030 uses a 32-bit data path (not 16-bit) and includes built-in 256K instruction and 256K data caches.

2 Math Coprocessor
Most accelerators offer an optional math coprocessor, either a Motorola 68881 or 68882, to speed floating-point operations. The NewLife 33 includes a 68882.

3 Static RAM Cache
Many accelerators include a high-speed static RAM cache to quicken the transfer of information between a fast processor and memory. This board uses 256K of 20ns static RAM.

4 Faster Memory
Many accelerators provide faster memory to keep pace with the addition of a faster processor. The 80ns RAM on the NewLife 33 displaces the slower 150ns RAM on the SE's logic board.

5 Copy ROM into RAM
Key routines from the ROM on the SE's logic board are loaded into the accelerator's RAM at start-up so that they are readily available.

6 RAM Disk
Many accelerators include software that lets you use the slower displaced RAM on the SE's board as a RAM disk.

even as fast as) a IIfx. In fact, only one of the 50MHz 68030 accelerators we tested—Siclone's 50MHz Intensifier ci—was faster than a Mac IIfx. When installed in a Mac IIci, the Intensifier ci created the fastest Macintosh we have ever tested, displacing the Mac IIfx as the reigning speed champion. Like the Intensifier ci, the 50MHz DayStar PowerCache IIci is a full-blown accelerator board that plugs into the Mac IIci's PDS (processor direct slot). In our tests, however, the 50MHz PowerCache IIci was not as fast as the Mac IIfx.

STEVE UNDERWOOD

For the Mac SE, a 25MHz 68030-based accelerator such as this one from NewLife Computer is the best value. The 16MHz or 20MHz boards are a bit cheaper but not nearly as fast. At the other end, 33MHz and 40MHz 68030 accelerators provide better performance than 25MHz boards, but at a premium cost.

A Memory Divided

Upgrading a Mac with a faster processor, however, won't address the whole speed problem. That's because the Mac still needs to transfer data from the main memory on the logic board to the processor over a data path or bus. With a faster processor, the bus becomes the bottleneck in attaining ultimate speed.

One solution to the bottleneck problem is to add a small amount of superfast, 20 nanoseconds static RAM (SRAM) to the accelerator. This SRAM acts as a cache between the accelerator and the main system memory already on the Macintosh. Data from the main system memory is stored in the SRAM, where the processor can grab it with very little delay.

Another common solution (especially on accelerators for the Plus and SE) is to place RAM directly on the accelerator board so that data transfers directly between the processor and the memory—bypassing the Mac's data bus completely. Unfortunately, you can't just take the standard RAM from the Mac's logic board and add it onto the accelerator. You need to match the faster processor with faster memory. For instance, the Plus, SE, and Classic use 150ns RAM, which is adequate for the 8MHz 68000 processor installed in these machines. If you upgrade one of these Macs with an accelerator that uses a 16MHz 68030 or faster processor, however, the 150ns RAM becomes woefully inadequate. You need at least 120ns RAM with a 16MHz 68030.

Accelerators that add a 33MHz 68030 or a faster processor and that don't use an SRAM cache may ideally require extremely high-speed 50ns RAM. Unfortunately, these fast chips are in short supply and nearly impossible to come by. No vendor was able to supply us with 50ns RAM. The workaround the vendors offer is to delay the processor so that slower memory can synchronize with it. This period of delay is called a wait state; the number of wait states an accelerator has varies depending on how much time is required to synchronize

ACCELERATORS

Company	DayStar Digital	DayStar Digital	Dove Computer Corporation	Dove Computer Corporation	Dove Computer Corporation	MacProducts USA
Product	PowerCache IIci	PowerCard 030	Marathon 020	Marathon 030	Marathon 030	030 RailGun
Processor	68030	68030	68020	68030	68030	68030
Price [1]	$1599 (40MHz)	$1699 (25MHz)	$1199 (16MHz)	$899 (32MHz)(II, IIx)	$599 (16MHz)	$791 (16MHz)
	$2699 (50MHz)	$2199 (40MHz)		$899 (SE/30)		$1141 (25MHz)
		$2999 (50MHz)				$1541 (33MHz)
Math coprocessor	optional	optional	optional	none	none	optional
Macintosh compatibility	IIci	II, IIcx	SE	II, IIx, SE/30	Plus, SE	Plus, SE
Type of memory	32K SRAM	32K SRAM	SIMMs	none	none	SIMMs
Possible RAM configuration	NA	NA	2MB or 4MB	NA	NA	1MB, 4MB, or 16MB
Suggested speed of on-board RAM (in ns)	NA	NA	100	NA	NA	70
Enable/disable accelerator	●	●	●	○	●	●
Enable/disable FPU	○	○	●	NA	●	●
Faster SCSI port available	○ [6]	○ [6]	○	○	○	● [7]
Connectix Virtual included	○	○	○	●	●	○
Warranty (in years)	1 [8]	1 [8]	1	1	1	1
Toll-free telephone support	●	●	●	●	●	○
Online service support	●	●	●	●	●	○

● = *yes;* ○ = *no.*

[1] *Price includes FPU and 4MB SIMMs if applicable.*

[2] *Prices for SE version are $200 cheaper.*

[3] *The Accelerator 25 includes a 68881 FPU.*

[4] *60ns for 33MHz, 40MHz, and 50MHz.*

[5] *For Mac SE only.*

[6] *Separate SCSI accelerator available.*

[7] *For Mac Plus only.*

[8] *30-day money-back guarantee.*

the processor with the RAM. For example, the 40MHz Gemini II from Total Systems requires four wait states to work with the 80ns RAM Total Systems sent us.

We found a performance degradation in products that compensate for slower-speed RAM by adding wait states. For instance, the 25MHz version of the Novy Quik30 requires 70ns RAM to run at one wait state, but the one we received came with 80ns RAM so we had to set the Quik30 at two wait states to synchronize the processor with memory. The MacProducts 25MHz 030 RailGun that we tested—essentially the same board as the 25MHz Quik30, since it was designed by Novy—came with 70ns RAM, and our test results show that it was more than 10 percent faster than the Novy board equipped with 80ns RAM.

Handling Math

Like students, accelerators vary in their aptitude for math. The Mac's processor is relatively inefficient at dealing with floating-point calculations (calculations involving decimal points). Floating-point calculations are most often used in CAD applications. They are also used in some spreadsheet calculations.

There are a couple of ways in which the Mac augments the floating-point deficiencies of its processor. The Plus, SE, and Classic rely on SANE (Standard Apple Numerics Environment) routines stored in ROM and in the System file to relieve the processor of the burden of calculating decimal-point numbers. A Mac can perform calculations faster, however, if you install a math coprocessor or floating-point unit (FPU), a special chip that is optimized for handling floating-point calculations. The Mac II comes with a 68881 FPU; the SE/30, IIx, IIcx, IIci, and IIfx come with a 68882 FPU.

Most accelerator vendors let you add an FPU to the accelerator board—an option that makes sense if you perform tasks that make abundant use of floating-point calculations. Generally speaking, the clock speed of the FPU should match the clock speed of the microprocessor. So, for example, if you add a 40MHz 68030 accelerator to a Mac II, you should also replace the Mac II's 16MHz 68881 with a 40MHz 68882.

To take advantage of an FPU, all accelerator vendors include an option called a SANE trap, which routes all mathematical computations away from the SANE routines contained in ROM and to the math coprocessor. Although slower, SANE routines are more accurate than the hardware routines found in the math coprocessor. The math coprocessor is sufficiently precise for most applications, but certain specialized applications require the exactness of SANE. For this reason all vendors let you turn the accelerator's SANE traps on and off, usually via the Control Panel.

Installation Notes

Some dealers offer free installation if you purchase the board from them; other dealers charge from $50 to $100. Although a number of experienced Macintosh users have successfully installed accelerators, attempting to do so is inadvisable for a number of reasons. Performing your own installation exposes you to the risk of serious—even life-threatening—electrical shock, even when the Mac is

Mobius	NewLife Computer Corporation	NewLife Computer Corporation	Novy Systems	Radius	Siclone Sales & Engineering	Siclone Sales & Engineering	Total Systems	Total Systems
030 Accelerator	NewLife 25	NewLife 33	Quik30	Accelerator	Intensifier ci	Si3033/Si3050	Gemini II	Voyager 030
68030 or 68EC030	68030	68030	68030	68020	68030	68030	68030	68030
$1160 (25MHz) (68030)	$995 (25MHz)	$1995 (33MHz)	$854 (16MHz)	$695 (16MHz)	$2899 (50MHz)	$1999 (33MHz)	$1145 [2] (20MHz)	$1795 (33MHz)
$911 (25MHz) (68EC030)			$954 (25MHz)	$1295 (25MHz)		$2999 (50MHz)	$1545 [2] (25MHz)	$3795 (50MHz)
			$1454 (33MHz)				$1745 [2] (33MHz)	
							$2045 [2] (40MHz)	
optional	optional	included	optional	optional [3]	optional	optional	optional	optional
SE	Plus, SE	SE	Plus, SE	SE	IIci	II, IIx	Plus, SE	II, IIx
SIMMs	SIMMs	SRAM and SIMMs	SIMMs	32K SRAM	64K SRAM	64K SRAM	SIMMs	64K SRAM
4MB, 8MB, or 16MB	1MB or 4MB	4MB	4MB or 16MB	NA	NA	NA	1MB or 4MB	NA
100	80	80	100, 70, 50	NA	NA	NA	70 [4]	NA
●	●	●	●	● [5]	●	●	●	●
○	○	○	●	○	○	○	○	○
○	● [7]	○	○	○	○	○	●	○
○	○	●	○	○	○	○	●	●
1	2	2	1	1	1	1	1	1
●	●	●	○	○	●	●	●	●
○	○	○	●	●	●	●	○	○

turned off. Many accelerators for the SE, and especially those for the Plus, are difficult to install because of the tight fit inside the case. The Mac Plus doesn't have a slot and wasn't designed for add-in products, so the accelerator attaches with a clip-on device that can be difficult to install and may present reliability problems if not attached correctly.

The interior of a Mac II is more accessible but you still have to be careful not to damage accelerator components. To install accelerators from Dove, DayStar, and Siclone you must first remove existing processor chips. DayStar provides a special tool (a PGA puller) to make this job easier. In general, the accelerators from these vendors include clear instructions and are relatively easy to install. Still, we can't warn you enough: if you opt to install these accelerators yourself, exercise extreme care when inserting the new adapter board into the sockets that once contained the original processor—otherwise you'll damage the new processor's pins, rendering the accelerator useless.

A couple of Mac models present installation hurdles that have deterred most vendors from producing accelerators for them. Newer SE/30s contain processors that have been soldered on; only the Dove Marathon 030 works with these Macs. The processor in the majority of Mac IIcx's is also soldered on; only DayStar sells an accelerator for the IIcx. However, you must send the Mac to DayStar for the installation. The NewLife 25 and NewLife 33 can't be installed on older SEs because the extra video connector on these accelerators doesn't fit into the SE's case.

STEVE UNDERWOOD

Siclone's Intensifier ci (pictured) and DayStar's PowerCache IIci are full-blown 50MHz 68030-based accelerators that plug into the Mac IIci's PDS slot. In general, the Intensifier was faster than a Mac IIfx in our speed tests, while the PowerCache was close to the IIfx in performance.

The accelerators we tested didn't have any compatibility problems. Most vendors have solved previously common problems with timing-dependent operations such as sound, AppleTalk, and formatting high-density floppy disks. In the event that one of these problems appears, most vendors let you turn the accelerator and its various features on and off to circumvent potential difficulties. Some Macintosh Plus and Macintosh SE accelerators permit the optional attachment of a large-screen monitor, but be sure that the accelerator you plan to purchase works with the monitor you have in mind; many combinations are incompatible.

Mac Plus and SE Recommendations

If you own a Mac Plus, it's not economically advisable to upgrade. To overcome the Plus's weak points, a

CACHE BOARDS

Cache boards are an appealing performance upgrade because they are inexpensive compared to accelerator boards. Cache boards fit into the IIci's processor direct slot and include from 32K to 128K of static RAM. This RAM acts as a high-speed cache; the IIci's microprocessor can access data and instructions more quickly from this cache than from the slower DRAM chips on the digital board. Bigger static RAM caches are not necessarily faster than small ones, since different boards use different information-handling techniques.

Cache boards for the IIci are available from companies such as Apple, Applied Engineering, DayStar, Micron, and UR Micro. PSI recently announced its 030 Bus Adapter Card for the IIsi, which provides a PDS slot for another board as well as a static RAM cache option. Macworld Lab tested two cache boards, the Micron Xceed and the UR Micro MacCache, to find out how much they speed up a IIci. We found that for a few hundred dollars, cache boards provide a IIci with about a 25 to 30 percent overall performance improvement.

prudent upgrade should include a more robust power supply and fan, not to mention a faster SCSI port. And vendors often charge extra for an installation kit for the Plus.

So, assuming you would spend about $1000 or more to upgrade a Plus, and assuming you can sell it as is for $600, you have at least $1600 toward a better Mac. A brand-new Classic with a 40MB hard drive costs less than that, while giving you better performance and higher reliability. (The Classic contains fewer components and connectors than the Plus.)

Alternatively, you could purchase a used Mac II. It is not uncommon to find such a system for between $2000 and $2500. Calls to a few dealers uncovered a new LC with a color monitor and keyboard for less than $2300. These models offer not only a major speed improvement over the Plus but also color, bigger screens, and the potential of upgrading to yet higher performance later.

Most of the vendors that provide Mac Plus accelerators also provide the same basic products for the SE. However, upgrading an SE with an accelerator is a more attractive option than upgrading a Plus, since you won't need to spend extra money on a SCSI port, a fan, or a power supply. For the improved performance, it's significantly less expensive to add an accelerator to an SE than to trade up. If you are on a tight budget I recommend shopping for the best deal on one of the 16MHz 68030 accelerator boards from MacProducts, Mobius, NewLife, or Novy. If you can spend a little more money, I recommend one of the 25MHz 68030 accelerators from MacProducts, NewLife, Novy, or Total Systems. For SE and Plus accelerators, 25MHz is the point of diminishing returns, where you get the best value for your money. The 33MHz and 40MHz 68030 accelerators provide another 10 to 20 percent performance improvement over the 25MHz boards, but at a premium cost.

Mac II Recommendations

If you own a Mac II or IIx, and are a real speed maven, I recommend purchasing Apple's $3000 Mac IIfx upgrade board. If you want the best price-to-performance ratio, however, I recommend any of the 25MHz or 33MHz accelerators from DayStar, Siclone, or Total Systems. These accelerators provide improved Mac II performance for between 30 percent and 50 percent less than the cost of a IIfx upgrade board.

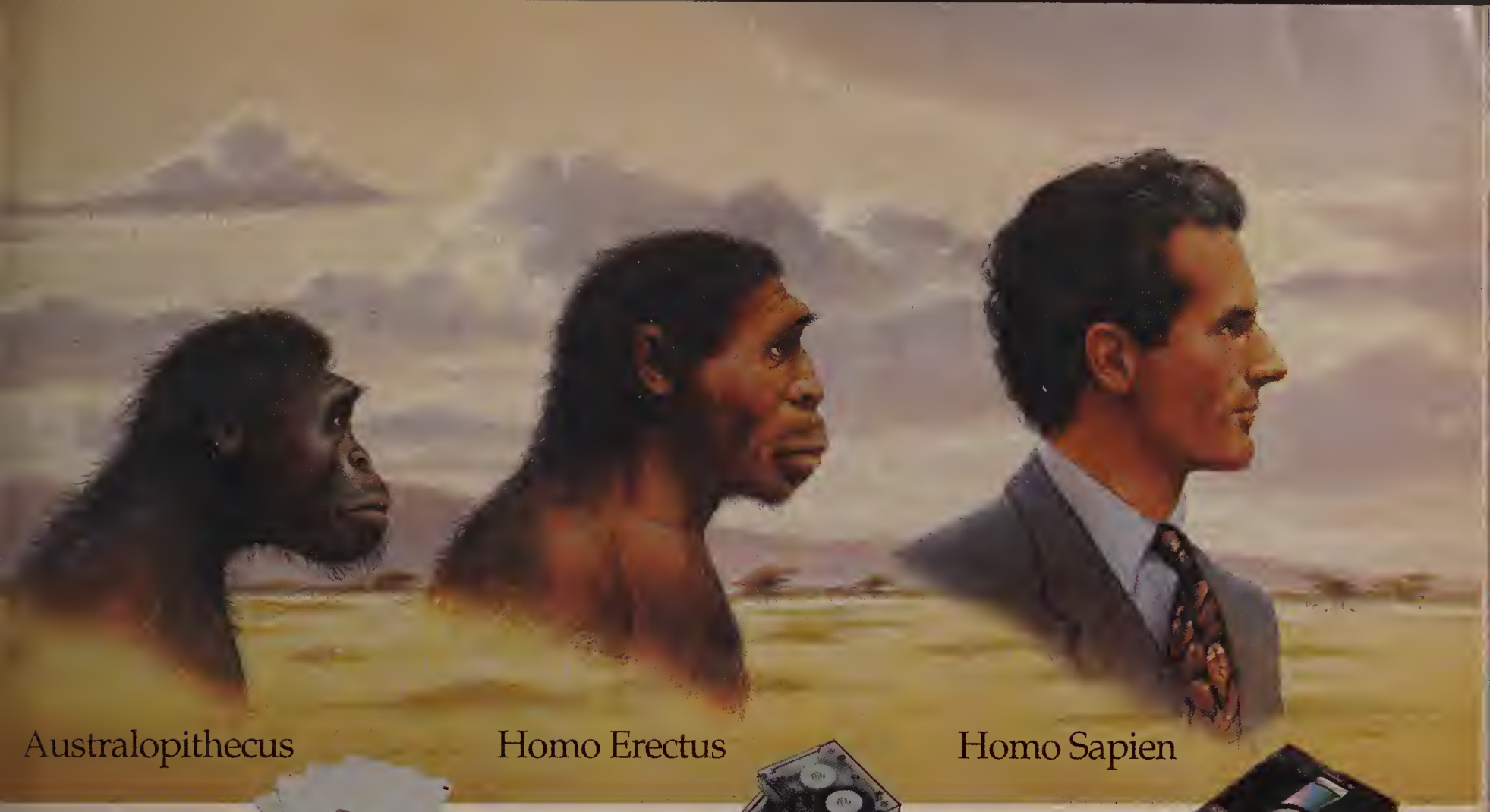
The best value for the Mac II, however, is DayStar's 25MHz PowerCard 030. It boosts the speed of a Mac II up to the range of a IIci for $1000 or so. At press time I was able to find street prices under $1000 for this accelerator without the FPU. If you're on a tight budget, the Dove Marathon 030 upgrade can freshen up the performance of a Mac II with roughly a 45 percent improvement for a street price typically under $500.

You have few options if you want to accelerate a Mac IIcx. You can either buy an Apple IIci logic board upgrade or purchase a DayStar PowerCard 030 in one of three clock speeds: 25MHz, 40MHz, or 50MHz. Again, the 25MHz version is the best value. The higher-speed versions make less sense to me; since they approach the price of the Apple IIci upgrade board, you should consider buying the Apple upgrade and adding a static RAM cache board (see "Cache Boards"). Adding a 40MHz or 50MHz PowerCard 030 to a IIcx gives you a Mac that is somewhat faster and less expensive than a IIci configured with a cache board. If you opt for the Apple logic board upgrade, however, you can enhance IIci-level performance later with a cache accelerator like the Siclone Intensifier ci or the DayStar PowerCache. Personally, I don't find the options compelling enough to upgrade my IIcx yet.

This brings us to IIci accelerators—the most promising products we tested. Both Siclone's speedy Intensifier ci and DayStar's PowerCache IIci have begun to ship. At press time, Sigma announced a similar accelerator, the Bullet 3040, which provides a 40MHz 68030 accelerator with 32K static RAM cache and data compression for both the IIci and IIsi. Top-of-the-line performance is expensive, however. Thus, you should try to live with an unadorned static RAM cache board for at least the next year or so. By then prices for the IIci accelerator boards should have dropped.

If you have an SE or a Mac II, you don't have to feel like you've been left in the dust as newer and faster Macs are introduced. With the many good accelerators available you can get a sizable performance improvement at a reasonable price. And that's just the ticket for returning the luster to your trusty Macintosh. ■

See *Where to Buy*, under Accelerators, for contact information.



This bipedal homonid lacked the ability to remain erect for very long and relied exclusively on floppy disks – 800k was adequate storage for his limited cranial capacity.

The need to inventory large stone and rock collections using tapes drove this wayward creature to the brink of extinction.

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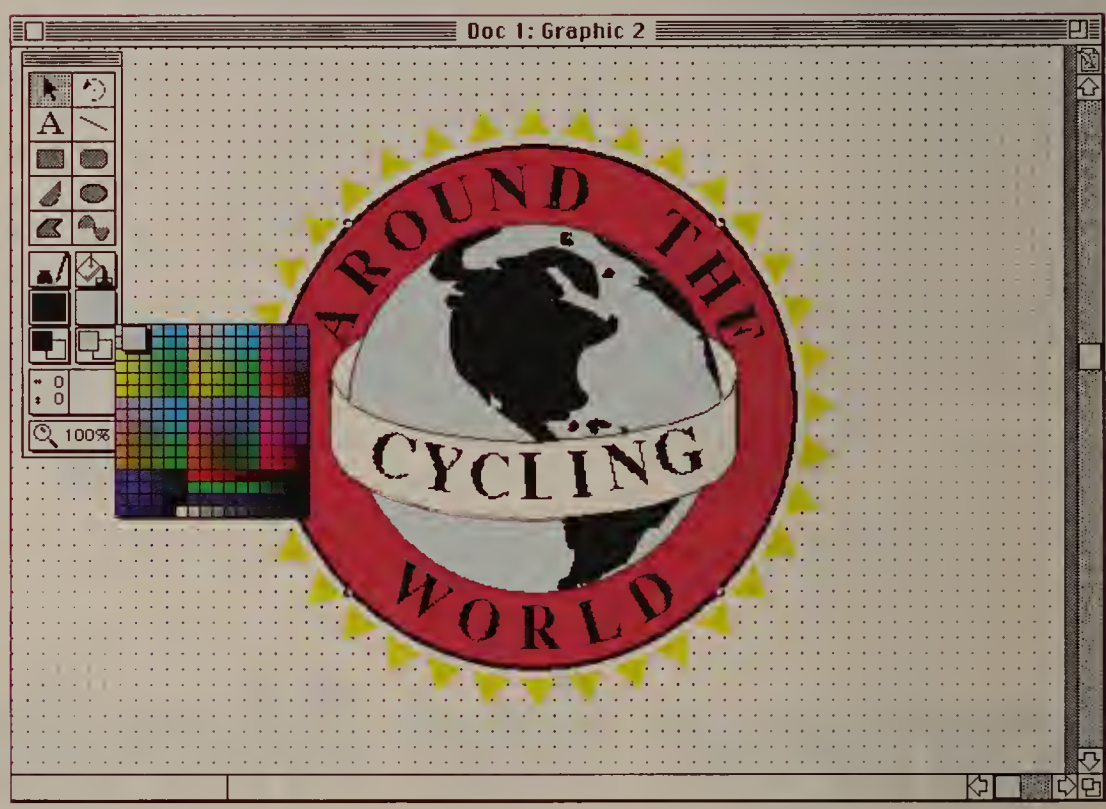
Circle 207 on reader service card

REVIEWS

Word Processor

WORDPERFECT 2.0

Pros: Mac-like interface; styles can be shared across networks; powerful macro editor. **Cons:** Awkward transfer of Microsoft Word files; performance sluggish at times; only one level of undo. **Company:** WordPerfect Corporation. **Requires:** Mac Plus; System 6.0.3. **List price:** $495.



The release of WordPerfect 2.0 goes a long way toward eradicating many of the idiosyncrasies of WordPerfect 1.0. Gone is the Byzantine interface with its peculiar buttons and its sea of submenus (down from 18 to 13—which is still a lot, but now they tear off). The revamped interface is much more to Mac standards.

The new interface is apparent as soon as you call up the ruler. In version 1.0 the ruler contained only tab and alignment buttons. The ruler now contains six pull-down menus, which include the version 1.0 commands as well as column assignment (up to 22), line spacing, and magnification (from 25 percent to 800 percent).

New Features Galore

WordPerfect 1.0 had macros, but you couldn't edit them; now you can. The easiest way to use this feature is as a tape recorder to eliminate repetitive tasks, such as inserting the closing of a letter. There is even a 400-plus-page macro manual that accompanies WordPerfect 2.0.

In market-leader Microsoft Word and in other word processors, styles are tied to a particular document; so to copy a style from one document to another in Word you must use the Define Styles option to transfer the style to your new document. In WordPerfect 2.0, styles can be made easily available (via a submenu) for any document you create—or for anyone else on your network.

The drawing layer includes color support; editable bezier curves; full rotation of text and graphics (PageMaker can't boast that); and the ability to place graphics within text, on top of text, and even behind text in the form of a watermark. WordPerfect imports graphics in PICT, GIF, TIFF, EPS, and paint formats. You can add one of 36 border styles and 64 border patterns to any amount of selected text.

All the tools function well, though bezier curve–editing functions are limited. And you can't place graphics with the freedom of a true page-layout program.

The text box feature lets you create sidebars, tables, and other ancillary text. Most of WordPerfect's features can be used to create these documents-within-documents.

When you move an object in most page-layout programs, markers in the ruler allow you to keep track of exactly where the pointer is in relation to margins and other page elements. WordPerfect 2.0 doesn't offer this feature, so positioning text boxes requires a bit of guesswork.

Rough Edges

Despite these impressive features, the rewriting of WordPerfect isn't perfect. The program's file-transfer capabilities are its most glaring imperfection. WordPerfect cannot transfer Word 4.0 documents directly. Instead, the Word file must be saved in RTF (Rich Text Format), opened in WordPerfect, and then, through the Save As function, saved to WordPerfect 2.0 format. According to the company, new Microsoft Word filters will be available in version 2.01.

Transfers between WordPerfect 2.0 and WordPerfect on the PC work fine. You can also transfer documents as text (ASCII) files.

WordPerfect's screen refresh is slow. There is a perceptible pause as lines wrap or move.

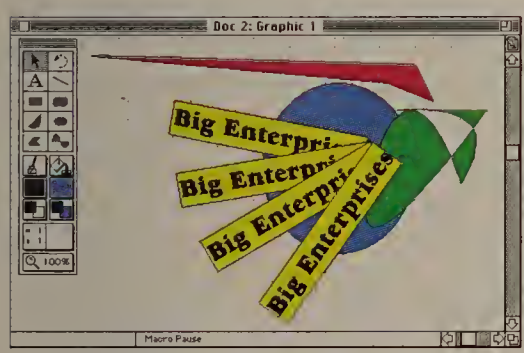
Selecting text with keyboard commands could be smoother. When you select a paragraph word-by-word, not only is the final word selected, but so are all the carriage returns and all the space to the margin. When you try to deselect, the penultimate word in the sentence is left highlighted as the other words become deselected.

WordPerfect lacks the ability to count the words in a selected block of text. Only full-document word counts are possible. You can perform a workaround using the spelling checker, which lists the number of words it has checked.

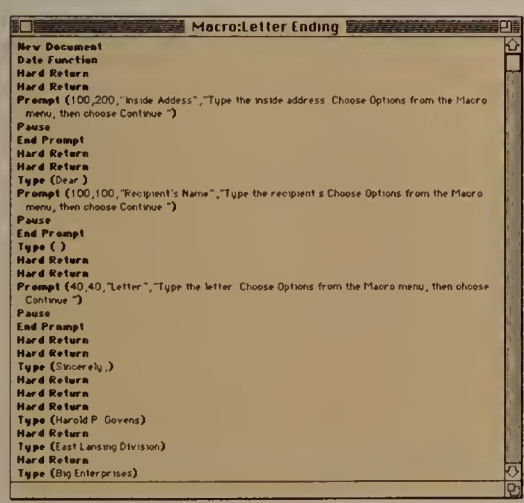
Some features available in version 1.0 are missing in version 2.0. The otherwise much-improved online help now lacks references to the corresponding page in the manual. And Undelete, which allowed three levels of undo, is also gone. With version 2.0's increased graphics-handling capabilities, multiple undos are a must.

All in all, this is a powerful word processor. WordPerfect is still not perfect, but it's so improved that there are undoubtedly people at Microsoft now looking over their shoulders with real concern, and for good reason.—**Philip Bishop**

See Where to Buy for contact information.



Words and Pictures WordPerfect 2.0 adds a drawing layer to its powerful word processor. As shown here, text (and graphics) can be freely rotated, and polygon and bezier curve tools are available. Graphics can be imported in PICT, GIF, TIFF, EPS, and paint formats.



Mighty Macros WordPerfect 2.0 takes the mystery out of macro making. This macro inserts the current date, a salutation, and a closing to a letter and lets you add an address block, pausing between each operation. The numbers in parentheses define the location of the prompt boxes.

Paint Program

OASIS 1.0

Pros: Lightbox tracing feature; good control of pressure-sensitive brushes. **Cons:** No zoom; no antialiased brushes; expensive. **Company:** Time Arts. **Requires:** Mac II; 5MB of RAM; System 6.0.5; 32-bit QuickDraw; color or gray-scale monitor. Recommended: Wacom pressure-sensitive tablet; 24-bit color board. **List price:** $795.

Painting by computer has always been somewhat of a compromise for artists accustomed to using paintbrushes. While there is a variety of paint software available on the Macintosh, the issue of simulating the subtleties of a paintbrush has always eluded even the finest paint programs. Oasis now offers these subtleties. (One bit of general advice: the more unique features of Oasis have been specifically designed to work with the Wacom pressure-sensitive tablet, so if you don't already own one, you might as well factor in the price of the tablet when you plan your software purchase.)

Different Strokes

The basic drawing tools found in Oasis, such as the primitive-shapes tools, the lines, polygons, eraser, and curve tool, all work as you would expect. The Artist and Effects brushes let you reasonably emulate various types of paintbrush strokes and paint styles—including wet and dry paint, pencil, chalk, pastels, and charcoal. These different styles are achieved by manipulating the "wetness" of the brush and the dispersion of the inner and outer edges of the brush stroke. The program's documentation provides a good starting point with initial settings for different effects. You can control brush size, paint opacity, and color with stylus pressure. A gradient bar enables you to link different colors to specific pressure settings: as you press down on the stylus, the brush smoothly changes color. The Effects brushes also offer a variety of modes, such as smearing, smoothing, pushing, tinting, and more.

The color-palette window offers a straightforward approach to selecting and mixing colors. You can use a finger smearing tool and airbrush to apply and mix colors, or you can use an eyedropper to pick colors from an image window. You can toggle between different color models, including HSB (hue, saturation, brightness), RGB, and CMY (cyan, magenta, yellow). The color-palette window also contains the gradient bar: you drag color swatches onto the bar, and the program automatically creates the intermediate gradients (much like the gradient control in Electronic Arts' Studio/8 and Studio/32). Video artists will appreciate the video safe switch, which insures that a selected color falls within a specific saturation and brightness range. For example, if you attempt to increase a color's brightness, Oasis lowers the saturation value in order to achieve acceptable video output. If you have a Truevision NuVista or NuVista+ or a RasterOps 364 video frame grabber, you can digitize incoming video directly from within Oasis—a handy feature.

Special F/X

Oasis's special-effects filters are generally good. The filters include emboss, reveal (which works exactly like the reveal brush, except that it works on selected regions), sharp, soft, saturation, brightness, contrast, monochrome, video colors (decreases saturation of bright red and blue regions), and others. The overall filter interface is quite gratifying: you are presented with a miniature display of either the currently selected area or the entire image, before and after the chosen effect. As you use the parameter sliders, an approximation of the affected image appears in the dialog

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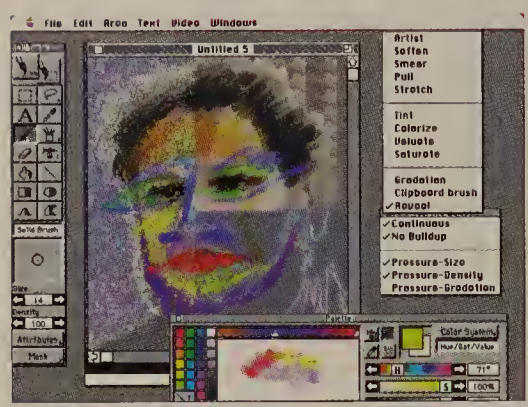
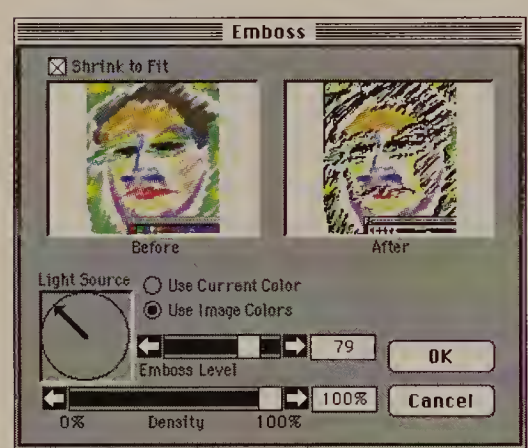


Oasis Lightbox The Lightbox feature enables you to superimpose an active painting window on top of another image document. You can either use the background image as a tracing guide or selectively reveal the background in the foreground image.



Filter Interface Oasis's filter interface displays pre- and postprocessed images, letting you preview an effect without processing the entire selection.

box. Being able to see the changes allows you to experiment with different settings before committing to processing the entire selection or image. You can also specify the normal and special-effects image mix in this dialog box for each of the filters.

A unique Lightbox command lets you overlap one image window on top of another, with the underlying image showing through. You can use this feature to create a new image by tracing with the brushes without modifying the underlying image (you can also specify the degree of transparency of the foreground image window). Or you can use a reveal brush to paint the underlying image into the foreground image window.

Oasis's mask function protects selections from being affected by the brushes and filters. However, the mask can't be saved with the document, you can have only one mask at any time, and the mask is only 1 bit deep, which results in rather harsh edges. The harsh edges almost negate the value of this feature entirely.

Still Thirsty in the Desert

I found Oasis to contain a number of problems for the typical Mac artist. One of the drawbacks of the various brush tools is that the edges of the brushes aren't antialiased, something you would expect from a program of this genre. Another major problem is that there are no zoom controls—you are always working at a 1 to 1 ratio, which can be a real hassle when you're attempting to fine-tune detailed artwork. (According to the company, the next version will have zoom controls.)

There is no facility for rotating images, only for scaling them (through the standard marquee tool). Oasis is also a memory hog—unlike Photoshop or ColorStudio, it has no built-in virtual-memory scheme. While the program can run on a 5MB machine, you'll really need 8MB to do any substantial work, especially when using the Lightbox feature. I also found that a faster Mac II, such as an accelerated IIci or IIfx, is more desirable for maximizing the brush-stroke speed and minimizing lag time. Even with a Mac IIfx, I experienced a delay when using larger airbrushes.

At print time, Oasis doesn't allow you to have a lot of control over image output quality. There are no halftone or screen controls; you're basically stuck with the standard printer parameters that are part of each printer's driver. You'll find yourself exporting Oasis images into other programs for printing.

The program's documentation is fairly clean and simple, but lacking in meaningful technical data. The manual could also use some color.

Oasis's biggest drawback is its price: at $795 this is an expensive paintbrush. If the program could better compete with packages such as Photoshop or ColorStudio, the price would be justified. As it stands, though, many Macintosh artists (specifically those who use a Wacom tablet) will find Oasis a useful addition to the capabilities of Photoshop or ColorStudio, but hard to justify at its current asking price. If you are mainly interested in re-creating real brush effects, Oasis is still worth a test run.

—David Biedny

See **Where to Buy** *for contact information.*

File-Compression Utility

STUFFIT DELUXE 2.0

Pros: Desk accessory, Finder-menu, and QuicKeys versions included; Finder-like file manipulation within archives; myriad security, IBM-translation, and scripting features. **Cons:** Installs 48 files on a hard drive; clutters System Folder; Deluxe archives can't be opened by StuffIt 1.5.1; somewhat confusing. **Company:** Aladdin Systems. **Requires:** Mac Plus; System 6.0.2; second disk drive. **List price:**$99.95.

StuffIt was a shareware gem that worked like a trash compactor: it crunched down any file to consume less disk space. This ability to shrink files made StuffIt a hit with modem users, who, by sending files in compressed form, could cut down the time they spent online. The recipient would use StuffIt to expand the file to its normal, usable state. Because the program was simple and efficient, it became a standard for Macintosh file compression.

StuffIt Deluxe 2.0, the commercial, dramatically enhanced version of the old standby, has an impressive list of features, an ambitious open architecture, and an infinite future.

Sprawling Tendencies

For all but the power user, however, *impressive, ambitious,* and *infinite* aren't necessarily desirable qualities in a piece of software. Indeed, one reason for the original StuffIt's success was its simplicity: double-click and go.

StuffIt Deluxe, on the other hand, consists of 48 files and litters the System Folder with an incredible 7 folders. It doesn't clump its files into a single folder, like other support-file–heavy programs. (Aladdin protests that three of these folders are mandatory in System 7 anyway, but that's little consolation to those of us trying to keep our hard drives manageable.) The total package consumes nearly 1.5MB of disk space—over ten times as much as the original StuffIt. The StuffIt Deluxe Installer does let you specify elements of the installation to

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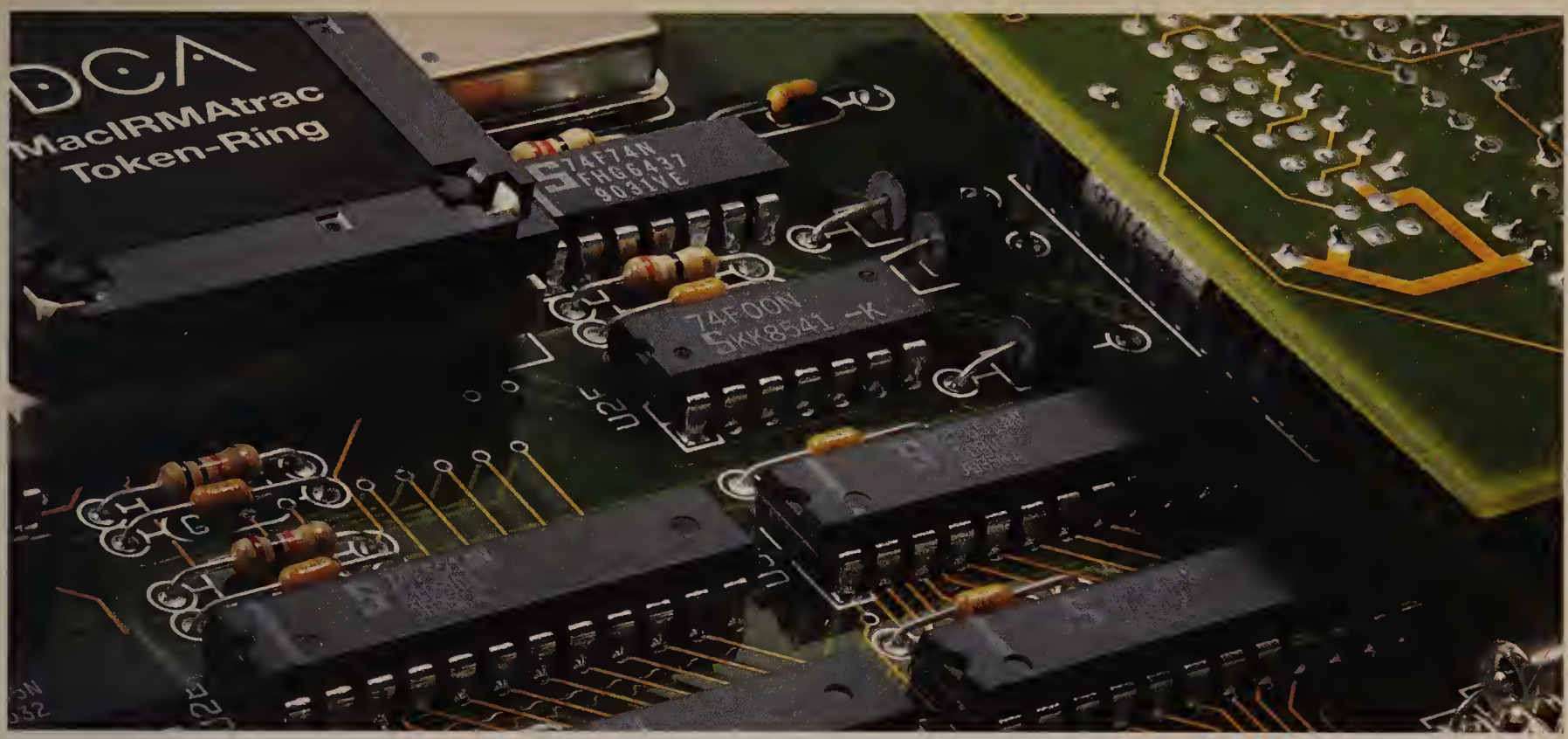

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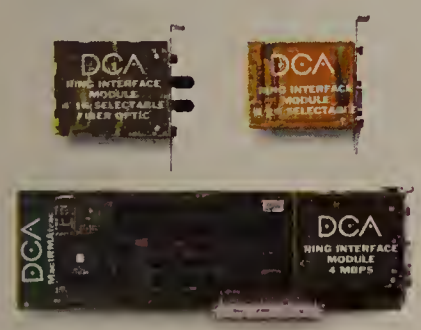

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Circle 71 on reader service card

omit; unfortunately, if you don't install everything, later when you try to do something the program beeps and announces that it cannot find something it needs. The Installer desperately needs a Minimum Installation button, like the one in Apple's System Installer.

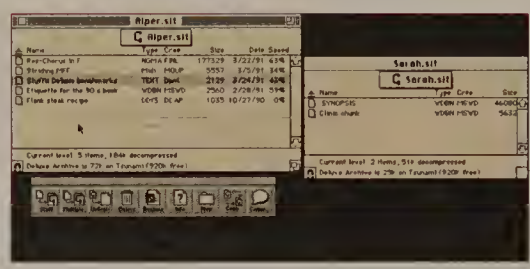
Feature Frenzy

If you've never worked with file-compression programs before, you have a lot to look forward to: gigantic TIFF files shrink to 5 percent of their original size. Most other files get compressed by half, making file-compression utilities great for maximizing hard disk space.

StuffIt Deluxe works the way StuffIt did: you create a container file called an *archive,* then select files you want to stuff into it. (Most people give the archive's name the .SIT suffix, indicating that it's been compressed with StuffIt.) Taking its cue from Microsoft Word, Deluxe lets you switch between Standard Menus, where the most technical commands are hidden, and Expert Menus . . . a great idea that could be carried further.

According to Aladdin, StuffIt Deluxe also has 70 other new features. Among the most useful: you can view the contents of multiple archives in different windows and drag stuffed files between them (see "Deluxe Interface"). There's more to Deluxe's Finder-like behavior, too. When you double-click on a stuffed folder in an archive, instead of unstuffing the entire folder (like the old StuffIt), the program opens a list of its contents that can be individually unstuffed. If an archive contains a text file or a PICT graphic, you can unstuff and view it without leaving StuffIt Deluxe. The program now allows you to select from a variety of different compression algorithms, each offering a different speed/compression ratio. (Unfortunately, their names aren't much of a selection guide. Your choices are Fast, Faster, Optimal, Best Guess, and Better.) The program's password-based security, virus detection, and IBM-file translators have all been enhanced.

For added security you can embed your signature into the archive. Unfortunately, you're forced to create your signature, using a MacPaint-type



Deluxe Interface In StuffIt Deluxe, every archive has its own window, and you can rename, delete, copy, sort, and move files between them just by dragging. A floating tool palette contains commands for most of these functions.

pencil, when you install the program—even if you have no intention of ever using this feature.

Extending the Metaphor

Of the new features, the cleverest are the extensions of the main program into other formats. For example, two desk accessories come with StuffIt Deluxe 2.0, StuffIt and UnStuffIt—yes, at last you can stuff stuff without exiting your word processor. There's also an INIT called Magic Menu, which puts a new menu on the Finder menu bar (à la DiskDoubler). Click on a file icon, choose Stuff or Unstuff—using the Magic Menu, you never have to encounter a dialog box. There's even an Extension for QuicKeys[2] that lets you stuff a specific file or folder as part of a macro.

StuffIt Deluxe 2.0 is faster than previous versions of StuffIt, and it's even generally faster than Compact Pro (Bill Goodman shareware). Even when compressing files for which it has special Optimizers (such as sound and text), however, Deluxe is still slower than DiskDoubler 3.1.2, which also produces smaller files in the bargain.

Of Visions and Versions

If StuffIt Deluxe is somewhat overblown, it's only because it was developed by a small, zealous, visionary company that earnestly wants to please everybody. You've never heard of technical support so good—I often found Aladdin reps answering the phone at ungodly hours; they maintain active and interesting folders on America Online, CompuServe, GEnie, and AppleLink; their updates, including version 2.0, have all been free; and they have exciting plans for integration with System 7.

The final example of Aladdin's goodwill—and another example of the confusion it can create—is that they have released yet another program: the new, confusingly dubbed StuffIt Classic. This shareware version, also called StuffIt 1.6, shares the file format, virus checking, online help, and Finder-like archive structure of Deluxe. (It does not offer the Magic Menu, desk accessories, or other extensible features.) StuffIt Classic is available from user groups and online networks; if you do use it, you're asked to send $25 to the company.

The upshot: there are *three* current versions of the program, and they're not mutually compatible. StuffIt Deluxe (commercial) and StuffIt Classic (shareware) are new and have the new file format. StuffIt 1.5.1 is the trusty old shareware edition—the real standard, gathered over the years by thousands of Macintosh users and reinforced by millions of online-service files.

In other words, in the interest of building a better program, Aladdin has had to abandon the standard that put StuffIt on the map; it will probably be years before the Deluxe/Classic format totally replaces the early version. Nonetheless, releasing a Deluxe-compatible shareware version was a generous and shrewd maneuver on Aladdin's part.

Compression Conclusions

The power-user features unique to StuffIt Deluxe include the Finder, DA, and QuicKeys extensions; scripting for automated selective backups; and translation of IBM-format Zip and Arc archives. If you require these features, rejoice; StuffIt Deluxe works precisely as advertised, is nicely priced, and is backed by a bright-eyed company.

If you're an ornery cuss like me, however, and resent having a humble utility dump a megabyte of clutter into your System Folder, get StuffIt Classic (1.6). It feels odd to recommend the shareware version over the commercial one, but for the casual user, Classic offers most of Deluxe's advantages without its sprawl. And hey—next time someone wants to create a new standard, how about making simplicity part of the formula?—**David Pogue**

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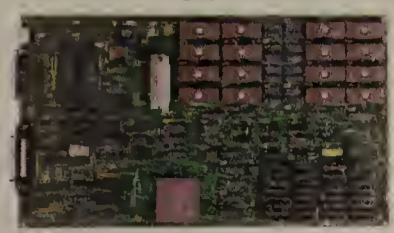

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Forecasting and Risk-Analysis Software

CRYSTAL BALL 2.0

Pros: The only software defense against spreadsheet forecasting mistakes; easy to use; notably enlightened manual. **Cons:** None. **Company:** Market Engineering Corporation. **Requires:** Mac Plus. **List price:** $395.

The day after the first computer spreadsheet was sold, someone somewhere began using it to make a wildly unrealistic business projection. This was simply the microcomputer version of the "garbage in, garbage out" phenomenon demonstrated back in the days of punched cards and room-size mainframes. Desktop computers gave average citizens the ability to delude themselves with a thoroughness formerly possible only for large corporations. There is, fortunately, a statistical way to sort through the connection between your own assumptions, probable facts, and projected outcomes; and that way is delivered in easy-to-use form in Crystal Ball.

The Art of Seeing

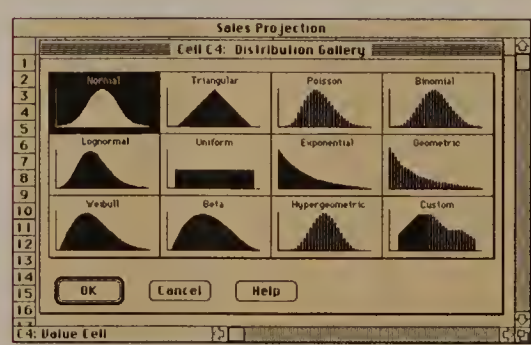
When you try to play "what if" in a spreadsheet, you typically make up a calculation similar to a budget, with cells filled with estimates of materials costs, promotional expenses, salaries, revenues, and other expected financial items, to arrive at an educated guess for profits. In a more sophisticated version, you might make up high, low, and midrange values for all the items. But the fact is that all this makes for a remarkably error-prone way to make an important estimate.

Instead of entering single numbers as values in spreadsheet cells, a more realistic way to make estimates is to give cells all the possible values in a weighted distribution. For example, rather than use a single number for sales, a calculation should be performed over and over with values for sales taking on probable values from a statistical distribution. Furthermore, if all important values in a calculation are actually represented by distributions, you have the most realistic simulation of your actual prospects that a computer can give you. The problem is, a standard spreadsheet can't do this kind of computation without dozens of pages of complicated macro programming. Crystal Ball is the solution to that problem.

Improving the View

To use Crystal Ball, you simply make up a basic spreadsheet computation representing the quantities in a projection as single values, then save the computation as a SYLK file (you can use any spreadsheet that saves files in SYLK format). When you open the spreadsheet in Crystal Ball, you can attach a distribution to any value in the projection. The Crystal Ball spreadsheet preserves formulas but can only substitute distributions for plain numbers, not formulas, in the original spreadsheet; the cells that display results computed with formulas (net present value computations and the like) will now show these results based on the distributions in the simple numeric cells.

To associate a distribution with a numeric value, you select the Define/Change Assumption command from the Cell menu, and pick the distribution you think corresponds to the real-world possibilities (see "Probable Suspects"). (The manual contains an easy-to-follow, comprehensive mini-course in distribution selection.) The ability to correctly select and tailor the distribution is what makes a Crystal Ball forecast statistically superior to the usual hit-or-miss spreadsheet methods. Because you are forced to pick a most likely distribution rather than simply entering your favorite number for a value, the chances of the program generating a realistic forecast are greatly improved.



Probable Suspects Crystal Ball gives you a wide range of distributions to use for values in assumption cells, and offers excellent advice on distribution selection. The Custom distribution lets you introduce market research and other real-world data to sharpen your projection.

The actual projection uses the Monte Carlo technique, meaning that a random number generator produces values for each of the assumption cells during a series of tests, and gives numerical estimates in the cells you have identified as forecast cells. Monte Carlo methods are compact enough that the projection can run on a basic Mac; if you have more memory you can select Latin Hypercube sampling for faster results. Version 2.0 has improved on a basic Monte Carlo projection. You can select correlations between values if you think you have some valid correlation assumptions. If you think house sales go down as interest rates go up, you can call up a correlation dialog box that lets you set the correlation coefficient, and the program will warn you if this correlation conflicts with assumptions you made elsewhere. You can also now use trend charts to explore in detail the way your uncertainties in a project expand as you extend forecasts further into the future.

Version 2.0 includes a few new spreadsheet-handling and interface improvements. You can open multiple spreadsheets and linked spreadsheets, use cell references instead of numbers in SYLK models, work with standard date and time functions, and leave circular references in iterative calculations. Report output now can have borders, use bold and italic fonts, and display assumption distributions; statistics reporting now includes exact calculated results; and exported result files can include statistics as well as forecast values.

A Prediction

The first version of Crystal Ball provided a unique service to people who make forecasts and risk assessments; the second version offers a particularly refined and feature-rich implementation of this service. It's the only known cure for unrealistic spreadsheet financial projections, it provides a valuable education in practical statistics, and its cost is, to be blunt, negligible compared to the cost of the mistakes it can help you prevent.

—Charles Seiter

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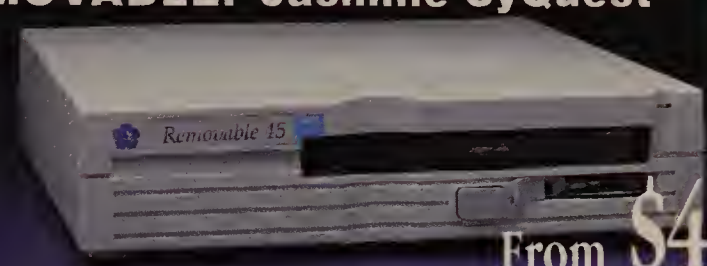

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Backup Programs

DISKFIT 2.0

Pros: Easy to use; can incrementally back up changed files only; reclaims floppy disk space. **Cons:** Poor tape support; limited file selection. **Company:** SuperMac Technology. **Requires:** Mac 512KE; System 6.0; hard drive. **List price:** $99.95.

NETWORK DISKFIT 2.0

Pros: Retains and restores AppleShare folder privileges. **Cons:** Poor file-selection; inadequate scheduling features. **Company:** SuperMac Technology. **Requires:** Mac 512KE; System 6.0; hard drive; AppleTalk or TOPS network. **List price:** $395.

DiskFit 2.0 and Network DiskFit 2.0 are the latest upgrades to SuperMac's popular backup programs. They add some frequently requested features, reaffirming DiskFit's place as one of the best backup programs for users with smaller hard drives. Time, however, has passed Network DiskFit by.

Both programs create a SmartSet, which is a set of disks containing all the files or documents on the hard drive. SmartSets can consist of applications and system files only, documents only, or both. Unlike some other backup programs, DiskFit maintains files in normal Macintosh format so that you can easily restore a single file from a SmartSet floppy disk to the hard drive. If a file is larger than a floppy disk's capacity, DiskFit breaks up the file to fit on two or more floppy disks.

Incremental hard drive backups couldn't be easier. Start DiskFit, press return, insert your first SmartSet disk, and hit return again (see "Fast and Clean"). That's it. The program scans the hard drive, prompting you to insert only those floppy disks that contain files that have changed since the last backup. Files that have been removed from the hard drive are erased from the backup set, making room for more data. DiskFit places a backup report in the System Folder that lists the folders and the floppies to which the files have been copied.

Although DiskFit is primarily intended for backing up to floppy disks, the program can handle any removable media that can be mounted on the desktop, including SyQuest, Bernoulli, and magneto-optical cartridges. DiskFit also backs up to some older DC-2000 tape drives, such as the discontinued SuperMac DataStream, but the process is slow. To access a tape drive on the Mac desktop takes a long, long time. Tape drive users are much better off using the software that comes with their drive, or Dantz Development's Retrospect.

DiskFit's included help feature is excellent. And the SuperMac technical-support people I spoke with (not toll-free) were knowledgeable, although I waited on hold for almost ten minutes. They also responded promptly to questions I sent on CompuServe and Connect.

What's New?

DiskFit now lets you select individual folders, although not individual files, for backup. You can exclude files from the backup set by type and creator. This exclusion feature needs to be refined; excluded file types are listed in a scrollable window, but DiskFit doesn't include the actual name of the excluded file type or application. The program also handles larger files than the previous version did; now you can back up files as large as 2 gigabytes. You can view and print the backup report from within DiskFit. And the new Subvolume feature lets you perform a duplicate backup to a folder on another hard drive. Unfortunately, you can't perform a SmartSet backup to a Subvolume, and you can only use the New Folder Selection feature with SmartSets, so Subvolume backups aren't as useful as they might be.

Delayed backups enable you to delay the start of a backup for a specified number of minutes. Most backup programs let you enter a particular time for the backup to begin. The delay feature for floppy disk backups is useless. This feature is mainly meant for tape users, but there are better programs for backing up to a tape drive.

Fast and Clean DiskFit has new features, but the main controls are still clean and uncluttered. After you start the program, it takes just two clicks on the mouse to start your backup.

Network DiskFit

Network DiskFit has much the same features as the single-user version, adding the ability to back up AppleShare or TOPS server volumes while retaining folder privileges. It also lets you back up a local hard drive to a folder on a remote volume. My speed tests showed that Network DiskFit provides acceptable backup speeds over AppleTalk to an AppleShare server, but the program still comes up short in today's network environment. No network administrator would attempt to back up a large network server to floppies; even SyQuest cartridges aren't sufficient. And the program's inadequate scheduling and unattended backup features rule it out. I recommend large-capacity (150MB and heftier) tape drives used with a superior backup program such as Dantz Development's Retrospect for server backups.

A Winner and a Loser

DiskFit has enjoyed a fine reputation for years for its reliability and ease of use. It's still a very good choice for users with hard drives as large as 40MB. A 40MB drive requires almost 30 high-density floppy disks for a complete backup. This is basically the realistic limit; more floppy disks, and you will require the patience of Job. If you have a medium-size hard drive (up to about 150MB) you can still use DiskFit well if you back up to a removable cartridge drive. But if you don't have a cartridge drive, a tape backup is a better choice for medium-size to large hard drives. And finally, network administrators should look elsewhere for their backup needs.

—Tom Negrino

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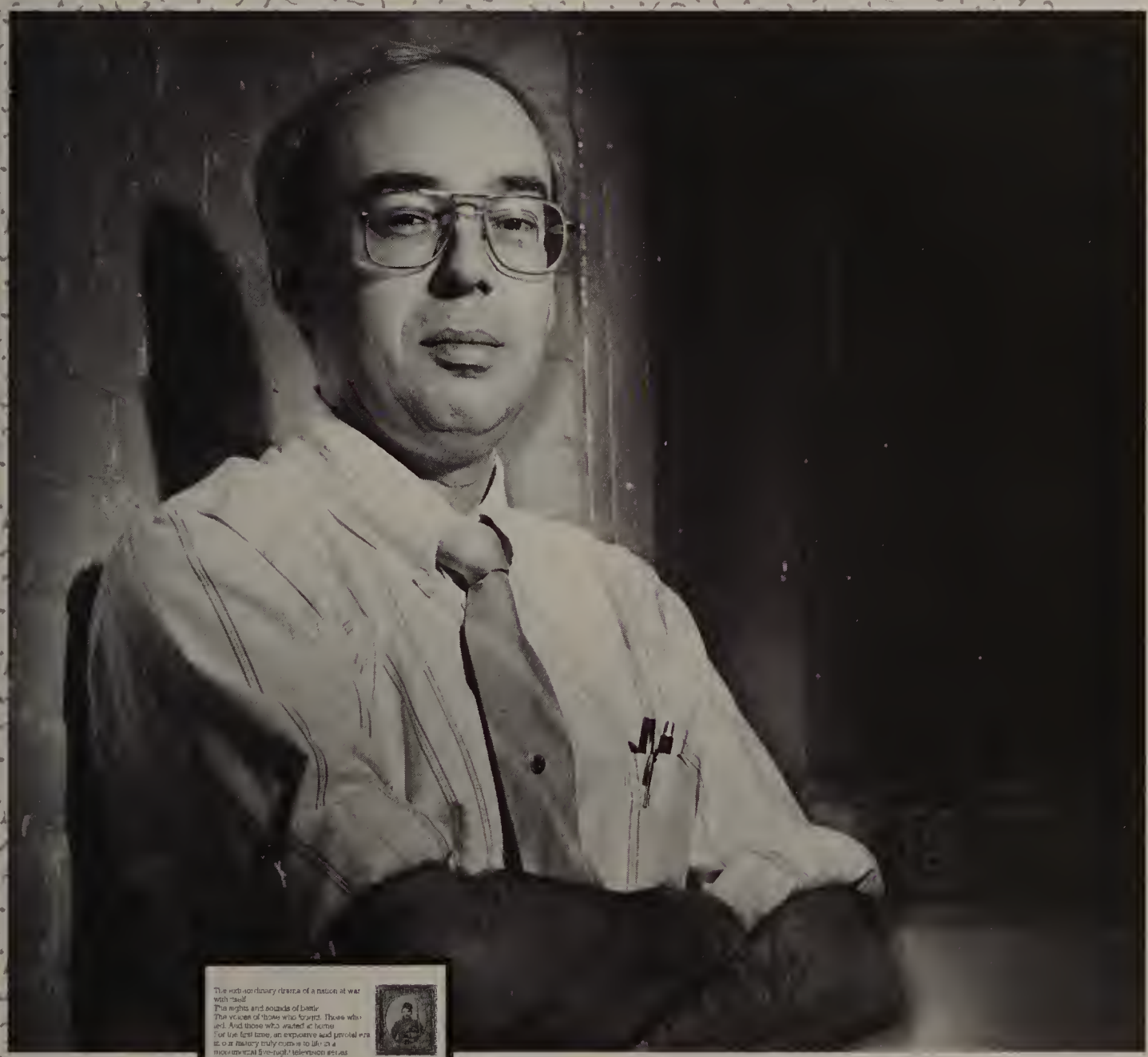

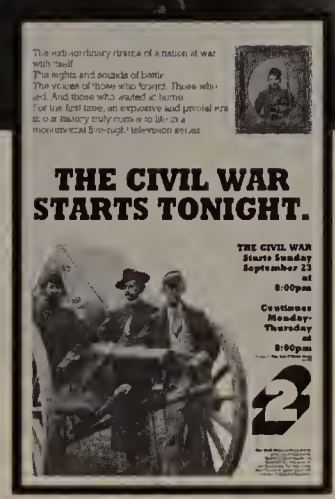

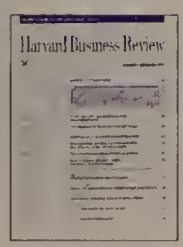

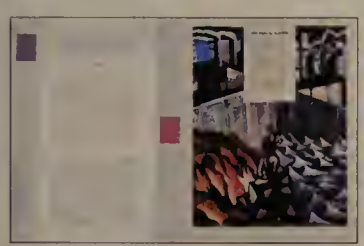

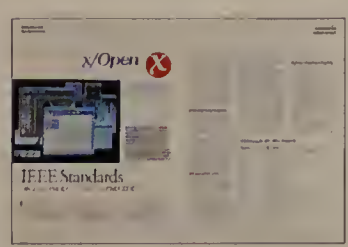

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Linotype-Hell

2-D/3-D CAD Program

MINICAD+ 3.0

Pros: Refined drawing features; relational database links to graphic elements; intelligent cursor adapts to drawing functions. **Cons:** Needs online help. **Company:** Graphsoft. **Requires:** Mac Plus; 2MB of RAM; hard drive. **List price:** $795.

Although frequently overshadowed by Claris CAD and others, MiniCad+ is a features-for-price value leader in CAD programs. Version 2.0 integrated a spreadsheet, a macro language, and improved drafting and 3-D features. Version 3.0, demanding a higher price and more hardware, is now a direct competitor of such high-end offerings as AutoCAD. The MiniCad+ cursor performs more tricks than a performing poodle; the program's easy-to-use 3-D features have become easier still; a built-in relational database lets you associate all kinds of information with drawing objects; and a DXF translator (for communication with other CAD packages) is now part of the Import and Export commands.

By Design

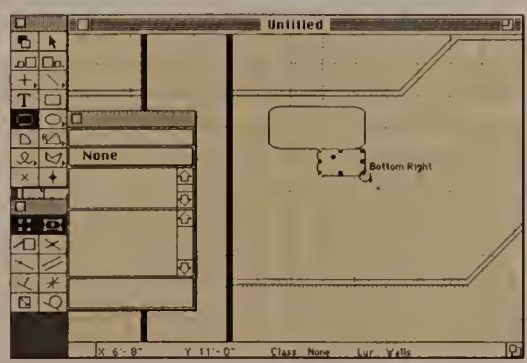
The basis of MiniCad+ is its strong 2-D drawing section. It has all sorts of editable lines, fills, and arrowheads; splines (cubic and bezier) for curve construction; mirroring; hatching; and provision for creating arrays of circles and other elements. The program provides as many drawing layers as memory allows, user-defined symbol libraries, simple zooms in and out, a constraint palette, and a flexible auto-dimensioning system. If all these MiniCad+ features sound good to you—and they're competitive with most of the popular 2-D drafting programs—but you don't care a whit for 3-D, you might look at Graphsoft's 2-D–only product, Blueprint, a $295 CAD program.

MiniCad+ 3.0's "smart cursor," a feature implemented to various extents in some other CAD programs as well (Ashlar Vellum, Claris CAD), changes its configuration as it passes over different parts of a drawing, indicating snap points, midpoints and endpoints of lines, intersections, tangents, and parallels. In practice this saves drawing time by eliminating guesswork and faulty positionings. When you select a drawing tool—the rectangle tool, for example—the cursor becomes almost deliriously chatty, spewing out location information in a tiny text box. You can turn it back to a plain arrow cursor if you find all this conversation distracting.

Adding It Up

The smart cursor is an important addition, but MiniCad+ actually serves a different conceptual function than do pure drafting programs. Like comprehensive workstation CAD programs, MiniCad+ is an attempt to automate much of the after-the-drawing work that a real project entails. Real drawings result in orders for components, cost calculations, and lists of machining or construction tasks. Processing this information by hand can be more time-consuming than generating drawings in the first place. That's why version 2.0 featured an Excel-like spreadsheet linked directly to a drawing (spreadsheet cells can also be linked to drawing objects).

The relational database in version 3.0, in combination with the macro facility, is Graphsoft's solution to the problem of automating numeric and object data in a drawing. Objects in a drawing can be tagged, with any type of text or numeric data—the data for the currently selected object appears in a Data Palette. A drawing of an office layout, for example, can include prices, suppliers, catalog numbers, and other information for all the furnishings and fixtures in the office. This information can then be searched. An architect might search for price as a criterion to identify stand-out cost items in the design. The real point of Graphsoft's grand design is that over time you buy or develop libraries of symbols, which have their own data palettes, and develop or buy third-party macros to automate assembly of the symbols into finished drawings. You then have a CAD system in which drawings can be generated, complete with parts lists, vendor sources, and other critical information, in a matter of hours. Graphsoft probably had something like this in mind when it included MiniPascal in the earlier versions (it's still there), but now mere mortals with drafting training can implement this futuristic vision using macros and the new database.



All Over the Place The smart cursor implementation in MiniCad+ makes a tiny patch of screen a rich source of information. Here the cursor identifies sections of a rectangle; in another mode it changes shape to signal geometric information on lines and line-based structures.

The Final Lines

MiniCad+ 3.0 might not yet be perfect, but Graphsoft is clearly trying. The program no longer runs on a 1MB Plus, but RAM is cheap (you'll be happier with 4MB than with the minimum 2MB). Drawing windows still lack scroll bars, and the menu bar still displays cryptic symbols, but these are quibbles. More serious annoyances are that you must buy all plotter support, and there's no online help (to be fair, a decent help file for a program like this would be huge). Finally, an obstacle to the full use of the program is that the manual is at many points more like a Pascal programmer's guide than a training document for people with a traditional drafting or even standard CAD background. With MiniCad+ 3.0 not only do you get everything *including* the kitchen sink, but you can define a reusable kitchen sink symbol, with its own linked data set of suppliers and prices. The catch is that some of the advanced functions are difficult to use if you don't have a programming background. Even so, with version 3.0, MiniCad+ has gone from very good to great as an advanced drafting program, and it offers lots of power beyond straight drafting to those willing to invest the learning time.

—Charles Seiter

See **Where to Buy** *for contact information.*

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Color Flatbed Scanner

MITSUBISHI SC-7500

Pros: 400-dpi resolution; 11-by-17-inch scan area; good registration of red, green, and blue color layers.
Cons: Expensive; poor image quality.
Company: Mitsubishi International. **Requires:** Mac II; 4MB of RAM; hard drive; 8-bit color board; color monitor. **List price:** SCSI version $8950; GPIB version (without interface board) $8450.

Most often the reviewer's job is a careful balancing act, a matter of weighing pros and cons and of making recommendations and qualifications. Sometimes, however, rendering judgment is easy. I can sum up my opinion of the Mitsubishi SC-7500 color scanner, for example, in three words: Don't buy one. The SC-7500 achieves the deadly distinction of combining the worst performance with the highest price in its class.

The SC-7500 is a 400-dots-per-inch, 24-bit color flatbed scanner with a scanning area that measures 11 by 17 inches. When this review was written, the scanner worked only with reflective art. According to the company, a transparency attachment with a projected price of $950 was scheduled for release sometime in the second quarter of this year, however.

The SC-7500 is unique among Mac color flatbed scanners in that it is a true one-pass device. Like virtually all other Mac scanners, the SC-7500 produces a 24-bit file containing millions of colors by adding 8-bit (256-color) red, green, and blue files together. All other Mac flatbed scanners produce the red, green, and blue files using one light sensor, which captures light tinted by red, green, and blue filters or produced by three separate color bulbs. Some scanners make three separate passes, and some take three readings for every scan line as the sensor proceeds across an image.

In contrast, by using three light sensors—each of which has been altered so that it reads only one color of light—the Mitsubishi can read a full 24 bits of color simultaneously. One might think that this would give the SC-7500 a speed advantage over its rivals, but actually the machine came in on the slow side in my speed tests. The one advantage of the three-sensor design is that scans produced by the SC-7500 are sharper than average because of excellent registration between the red, green, and blue layers. Slight misregistration of the color layers is common in Mac scanners, and can cause blurred edges and softened details.

Perfunctory Programs

The SC-7500 ships with two pieces of software: a ColorStudio module and a stand-alone program called SC-Scan. The ColorStudio plug-in enables users to access basic scanning functions from within Letraset's color image-editing package—which is *not* bundled with the scanner, in case you were wondering. SC-Scan provides more features than the ColorStudio module, and SC-Scan also enables users to avoid some of ColorStudio's limitations (for example, ColorStudio doesn't work with 1-bit black-and-white files at all, and 8-bit gray-scale files in the program take up as much memory as 24-bit color files). Either of the SC-7500's scan programs can get the job done. Neither will be winning any prizes this year, however.

Both programs suffer from bad design decisions. For example, both programs offer only five settings for scan resolution. This limited field of choice means users will frequently have to either live with scans that take up more memory than is necessary or take the extra step of using a program like ColorStudio to eliminate the unwanted information. And none of the five resolution options corresponds to screen resolution—a frequently used setting in multimedia and other on-screen applications.

A worse failing of both programs is that neither warns you when you're about to begin a scan that requires more than the available disk space. This omission is particularly annoying in the case of the ColorStudio module, since whenever you lose, cancel, or complete a scan in that program—or simply close the scan module for a minute to do something else—the software throws away the prescan. (A prescan is a small, low-resolution scan used in most scan software to select an area of an image for final scanning.) Having to continually redo a prescan would be irritating with any scanner,

(continues)

VIESTI ASSOCIATES, INC.

Dark and Dirty As this comparison shows, the SC-7500 does a poor job capturing color. The image on the right is a conventional separation; the one on the left was color-corrected and separated in Photoshop and printed on an Agfa SelectSet.

but it turns out that the SC-7500 is the second-slowest prescanner in the Mac market, with each prescan taking a full minute and a half.

SC-Scan offers some relatively fancy features like controls for redrawing gamma curves for on-the-fly brightness correction and the ability to save sets of scan parameters by name for later use. However, it doesn't have one of the basic requirements of a scanning program—the ability to resize an image during scanning. And the program has a generally clunky design that forces users to go through extra steps and to be conversant in unnecessarily techy terms like *xmin*, *ymax*, and *CLUTs*.

The Proof's in the Printouts

So-so software is an annoyance, but in itself it would never be enough to earn a scanner a thumbs-down rating. In the final analysis, a scanner lives or dies by the quality of the scans it makes. To put it bluntly, the Mitsubishi's scans look as bad as any I've seen.

What do you look for in a color scan? Well, one obvious thing is color. The color separations I had made of test photographs scanned with the SC-7500 came back looking very, very gray and colorless. The focus was sharp, as mentioned above, but the colors were extraordinarily murky and not at all pleasing (see "Dark and Dirty").

Numeric testing (in which I read color values off the screen using Adobe Photoshop's histogram) identified one reason, perhaps among many, for the Mitsubishi's poor color response. Tests with standardized red, green, and blue color swatches showed that the scanner has a difficult time seeing red. The red channel is contaminated by green at a higher level than that exhibited by any other Mac flatbed I've tested (see "Affordable Color Scanning," *Macworld*, June 1991). Overall, the scanner also has an unusually strong bias toward blue, but that tendency is easier to correct than the color "cross talk." If you're paying a premium for a 400-dpi scanner, my assumption is that you intend to scan for print separation. I have to say that, for this purpose, the Mitsubishi's results are unacceptable.

To sum up: the SC-7500 is slow, ugly, and inconvenient. That would be bad enough, but it also costs $8950—over $1000 more than its 400-dpi flatbed competitors, the Agfa Focus Color ($7995—not including software) and the Howtek Scanmaster 3 ($6995 plus $1200 for GPIB board and Photoshop). If you need 400 dpi (typically, if you'll be enlarging transparencies or other materials but can't make the 600-dpi price point of $12,000), both these units provide good-quality scans. The Agfa has an 8¼-by-11¾-inch scan bed, so if you need an 11-by-17-inch bed, get the Howtek or, if 400 dpi isn't important to you, the 300-dpi Sharp JX-450 ($5995).

Before buying any of those units, however, I'd check into two new models that were announced but unavailable at press time. The Fujitsu M3096 and the Prime Option Phovos 400C are both 400-dpi flatbeds, and both had a projected price of about $6500. Much more like it, in my opinion.—**Joe Matazzoni**

See **Where to Buy** *for contact information.*

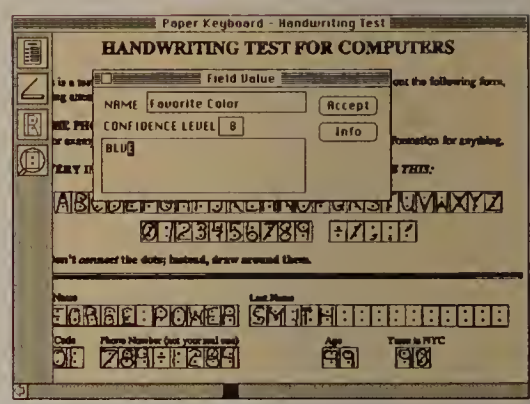
Handwritten Form Recognition Software

PAPER KEYBOARD 1.2

Pros: Handles check boxes well; under optimum conditions, saves time. **Cons:** Crude interface; requires unnecessary programming; cryptic manual; unreliable import of TIFF files. **Requires:** Mac Plus; 2MB of RAM; System 6.0; Apple, Abaton, or HP ScanJet Plus or any flatbed scanner that generates TIFF files. Recommended: Sheet feeder. **Company:** Datacap. **List price:** $895.

Fast Times is a magazine for high-school students. To capture teenage tastes and trends, its editors wanted to take a nationwide opinion poll of its readers. The problem: how to process the 20,000 mailed-in responses. Typing each into a database would be impossibly tedious.

They discovered Paper Keyboard, a unique program that works in conjunction with a scanner to recognize handwritten responses on printed forms. For *Fast Times*, the solution was successful, because the magazine hired Datacap to do the actual processing of the forms. Had the magazine's editors tried to work the program themselves, they might have discovered that Paper Keyboard is a wonderful concept whose implementation needs some work.



The Paper Key During the Paper Keyboard recognition process, the scanned image appears in the background. In the foreground, the program flags letters it's uncertain of—in this case, the *E* in *Blue*—so you can approve or edit them. When you program the form, you specify a confidence level for each field; in other words, you get to specify how insecure the program has to be about a particular letter before it questions you for input.

Designing in Formation

Paper Keyboard won't work with any old form—it only works with forms that have been designed with Paper Keyboard in mind. Using the special PostScript font provided, you create a form's blanks by typing a row of blank rectangles, or *dominos* (see "The Paper Key"). The font also includes check boxes for multiple-choice responses, as well as crosshair *anchors* to place in the corners of the form. When you scan a completed form, Paper Keyboard looks for these anchors to orient itself on the page. Dominos, check boxes, and anchors must be placed with white space around them according to Paper Keyboard's specifications, or the form-recognition process doesn't work.

Now you conduct a poll, survey, or questionnaire. This part is tricky, too. You have to persuade the participants to fill out the forms according to Paper Keyboard's rules. Respondents must write in a special block style, based on a model alphabet (which you should include on each form), drawing each letter

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We give you more options. Our own MacAvenue product line of hard drives, monochrome and color displays, modems and scanners gives you a value-priced alternative for Mac peripherals. For example, our hard drive is more than just another pretty case. Its metal interior and plastic exterior — designed like the Mac's — controls air flow and buffers the drive noise. When you work with the MacAvenue drive, all you hear is the sound of one hand clapping. But don't take our word for it. Ask Robert Wiggins, *MacUser*'s longtime business columnist, who gives the Protegé drive his "highest recommendation."

Protegé Hard Drives

Capacity	External		Internal	
	Seagate	Quantum	Seagate	Quantum
20+MB	$345	n/a	$295	n/a
40+MB	$395	n/a	$325	n/a
50+MB	n/a	$479	n/a	$349
80+MB	$525	n/a	$465	n/a
100+MB	n/a	$669	n/a	$539
200+MB	n/a	$979	n/a	$899

MacAvenue Announces the End of the Scroll Bar

Constant scrolling or waiting for your screen image to refresh can take the creative joy out of graphic design. So MacAvenue rescues you from the creative doldrums with a larger and sharper image of your whole design. No scrolling.

Our Protegé Display systems are value leaders in large-format Macintosh displays. Sharp screen images, flicker-free refresh rates and convenient ergonomic features such as tilt/swivel base our displays are comparable to Apple and Radius products that can cost twice as much.

The 15", ultra-high resolution screen of the Protegé features a complete 8 1/2" x 11" page with no reduction of image size or quality. Complete with video card, it's only $495. Or get a 2-page view with the 20" Protegé Dual-page Display for a mere $895. And each Protegé monitor comes complete with After Dark and Now Utilities software — *FREE!* For a second opinion, ask Bob LeVitus, author of *Dr. Macintosh*, who says, "I love the crisp, bright image I get with a Protegé Display. And with the 30-day, no-questions-asked, money-back guarantee, you just can't go wrong. I highly recommend the Protegé Display."

Today's powerful graphics programs require a color display, and MacAvenue offers a bargain on Seiko Trinitron displays, complete with video card. Our price will make you look twice at color.

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Protegé Displays

Protegé Full-page Display w/Mac II Card	*22013*	$495
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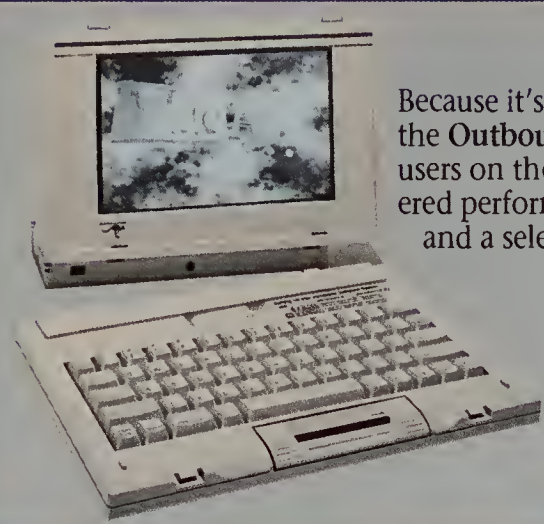

On the Road with Outbound

Because it's lighter and less expensive than the Mac Portable, the **Outbound Laptop System** is the best choice for Mac users on the go. The Outbound offers 15MHz, 68000-powered performance with a sharp 640x400 pixel LCD screen and a selection of useful accessories and peripherals.

Outbound Laptop System w/ 512KE ROMs, 2MB RAM and 40MB Drive *22000* $3439
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The **EtherPrint** connector simplifies the Ethernet/LocalTalk printer connection. The Dayna Etherprint makes a simple "plug-and-print" connection fast and cost effective. Includes adaptors for any cable/printer combination.

EtherPrint (Dayna) *22541* $355

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Premium Type Gallery PS w/ CDR-73 .....*24635* $9995
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Quantum
52MB LPS Internal - (IIcx,ci).....*24194* $349
52MB LPS Internal - (SE-IIx) *24198* $349
105MB LPS Internal - (IIcx,ci).....*24195* $539
105MB LPS Internal - (SE-IIx) *24199* $539
210MB Internal - (IIcx,ci) *24196* $899
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Nuvotech
Nuvolink SC.....*22535* $389
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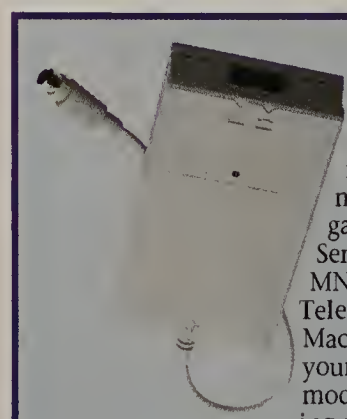
NetSerial X232 .....*22504* $275



Global Village TelePort/FAX 9600

It's easy to send FAXes from any application's menu bar with this elegant, compact 9600 baud SendFAX and 2400 baud MNP5 data modem. TelePort connects to your Macintosh by ADB, just like your mouse, freeing your modem port and eliminating a power cord. An Eddy Award winner.

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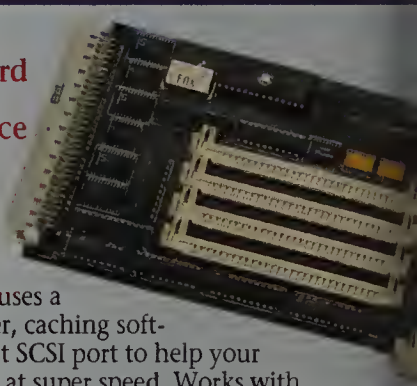

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DayStar's **SCSI PowerCard™** uses a memory buffer, caching software and a fast SCSI port to help your drives operate at super speed. Works with any SCSI storage device — hard drive, CD-ROM, or Syquest removable media drive.

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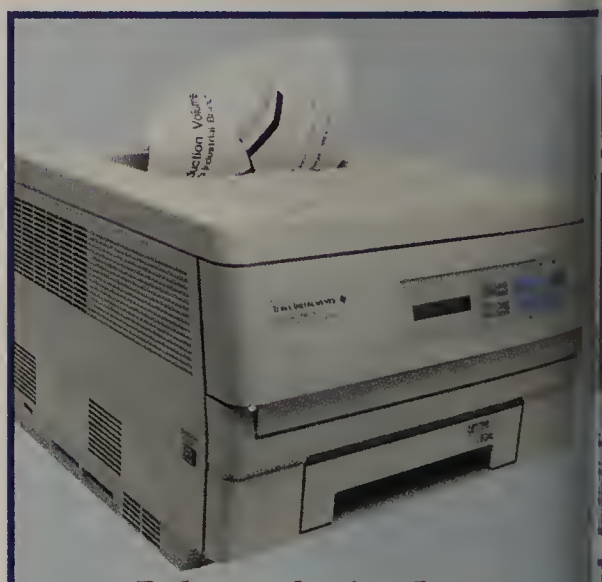

Enhanced microLaser

Texas Instruments has added 16 page-per-minute printing speed to their popular line of **microLasers**, the printer that was awarded 4½ mice from *MacUser*. The **microLaser XL** offers the same quality output as the original microLaser and it offers added upgrade flexibility.

TI microLaser XL
35 font w/ AppleTalk *22859* $3095
17 font w/ AppleTalk *22858* $2795
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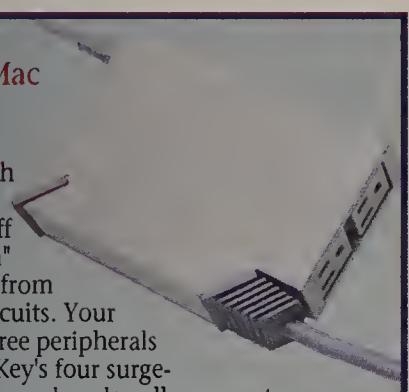

Power up your entire system with the touch of a key and turn it off with "Shut Down" using PowerKey from Sophisticated Circuits. Your computer and three peripherals plug in to PowerKey's four surge-suppressed outlets and a cdev allows you to set up a timed on/off and macro schedule for unattended operation. Bundled with QuicKeys Light.

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- 101 Extended Keyboard ADB *25186* $99

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- DT3600 Digitizing Tablet *23734* $295

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- UPS 370ci *26294* $329

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- Bernouilli B33C 44MB Tape Cart *57804* $95

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- SE Anti-Glare Filter, platinum *26883* $32

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- MacSpeaker *26923* $179

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- Asanté MacCon+ IIE thk/thn *22538* $375

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- Voice Navigator II *23736* $649
- VoiceLink *23738* $199

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- Adobe Plus Pack v1.0 .....*29834* $129
- Streamline v2.0 .....*29269* $129
- TypeManager v2.0 .....*29825* $64

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- PageMaker v4.0 .....*29781* $497

Broderbund Software
- Typestyler v1.5 .....*30450* $115

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The **QuadraLink** from Applied Engineering makes quick work of Mac II system expansion by adding four serial ports to your Mac. This NuBus card is easy to install and is compatible with System 7.0. A special "shadow driver" insures compatibilty with older software.

QuadraLink (Applied Engineering).... *26917* $205

Claris
- Claris MacWrite II v1.1 .....*30586* $142

DeltaPoint
- Taste *30638* $86

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- Microsoft Word v4.0 .....*30582* $245
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- Grammatik Mac v2.0 .....*30634* $50

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- Microsoft Works v2.0 .....*30581* $194

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Too Much Fun

No matter what kind of fun you might be in the mood for, **MacAvenue's new Fun Pak II** has just what you need! Take your pick — from Apache Strike's fast-paced action to the calmer strategies of Shanghai. You'll be a winner every time! Also includes Solitaire Royale, Talking Moose and Dark Castle — more than $200 worth of software for only $49.95.

MacAvenue Fun Pak II *29410* $49.95

Acius
- 4th Dimension v2.1 .....*27780* $489

Claris
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Fox Software
- FoxBase + Mac v2.1 .....*27791* $292

Informix
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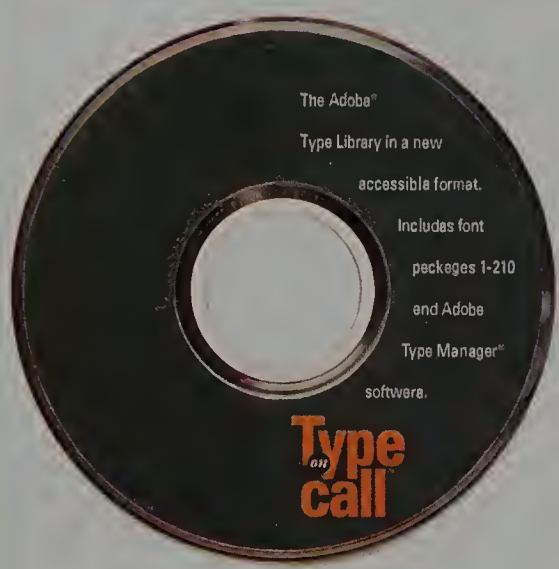

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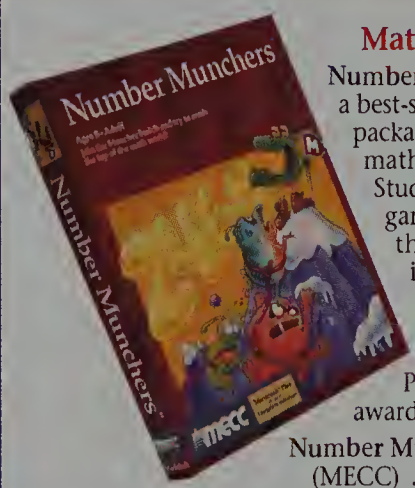

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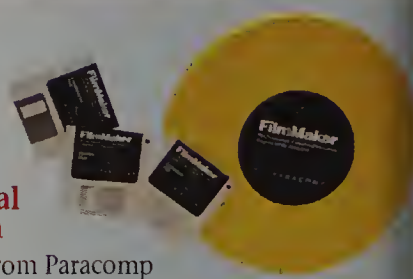

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around the dots in a domino. Paper Keyboard–style lettering looks fairly normal; only the shapes of the *6, 7, J, Q, R,* and *U* are liable to take the form-fillers by surprise.

Pure Speculation

Before scanning the completed forms, you must describe the incoming images to Paper Keyboard by writing a *form spec*. This text file contains programmerese descriptions of every blank or box in the form, including the name of each field; the exact coordinates of each field's corners (in tenths of a millimeter); the length of the field (in characters); the data type (text, numbers, and so on). The process is staggeringly tedious if you're not already a programmer. It's a struggle to figure out the exact vertical and horizontal tenth-millimeter coordinates of every corner of every field, even using PageMaker's centimeter rulers option.

That you're condemned to programming this form spec is ridiculous—what's a computer for? The IBM version of Paper Keyboard will let you indicate the corners of each field simply by clicking; the program writes the form spec automatically.

Scan of Worms

Fortunately, Datacap's developers told me they're happy to help you compose the form spec—if need be, the company even writes it for you (using the IBM version, of course). "We're not going to let you fail," promises a spokesman. Indeed, after a day of frustration, I gave up and let the company write the form spec for me.

To test Paper Keyboard, I distributed a 1-page, 10-question survey to 30 random New York City residents from wide social, age, and ethnic ranges. As an incentive to fill out the form correctly, I gave each a dollar.

Unfortunately, you can scan directly into the program only if you have the Apple Scanner, the HP ScanJet Plus, or the Abaton flatbed. If you use another scanner, you have to save every page as a 1MB-plus TIFF file, which Paper Keyboard can then read. Correction: Can *sometimes* read; Datacap says that subtle variations in TIFF files may prevent Paper Keyboard from reading them. In my tests with a Seiko scanner, Paper Keyboard choked on about a quarter of the TIFF files, indicating its displeasure by displaying the helpful error message "Tfrdstrp: read@906748 got 17want 1048576018."

Datacap warns, too, that to make the Paper Keyboard process worthwhile you really need a sheet feeder for the scanner. Imagine placing each of 20,000 *Fast Times* poll forms on the glass of a flatbed scanner—knowing that if a page isn't perfectly aligned, Paper Keyboard won't read it.

Top Form

If you've made it this far, you get to the good stuff: the recognition process. Paper Keyboard displays the scanned image of a form in a background window, whipping through field after field. The program reads the handwriting or the check boxes as easily as you or I, and sends the form's tab-delimited data into a text file you can later import to a database for analysis and printing. When it works flawlessly on the first attempt—as it did on 2 of my 30 test forms—it's a breathtaking glimpse of handwriting recognition's future.

If the program has any doubt about the contents of a field, it stops reading and presents a text-editing box, where you can either approve or edit its guess. Paper Keyboard is extremely smart about when to consult you. In every instance, you see immediately why it doesn't recognize a letter: somebody drew outside the domino or crossed something out, for example. You can probably guess the distinctions that it has trouble making: A/R, V/U, T/Y, and so on. As you sit and correct guesses, you wish you'd spent even more time telling participants the importance of careful lettering-around-the-dots. You are happy, however, that you only have to retype the questionable responses, while Paper Keyboard enters everything else.

A number of sloppy interface and programming quirks mar the recognition process, however. If the paper wasn't straight in the scanner—and therefore the program can't locate the anchor crosshairs—there's no way to adjust anything or help the program find the crosshairs; you simply have to rescan the form. (That will be fixed in the IBM version, says Datacap.) If you edit one of Paper Keyboard's guesses and then change your mind, there's no way to go back and edit your mistake; you have to discard the good data along with the bad and, again, rescan the form.

The Future Isn't Now

If you meet the following conditions, the fledgling Paper Keyboard might be worth considering: You have one of the three supported scanner models, with a sheet feeder. You process enough forms to justify the considerable time, expense, and learning time. The people filling out the forms will take special care in printing any letters (check boxes, on the other hand, work like a charm, requiring much less care). And you're ready to spend long hours working with a poorly designed interface.

If that doesn't describe you, you'll have to wait for the intelligent form-spec version that Datacap promises will eventually appear.—**David Pogue**

See Where to Buy *for contact information.*

Utility Collection

NOW UTILITIES 2.03

Pros: Wide variety of system enhancements; some elements competitive with top-of-the-line, single-purpose utilities; excellent value. **Cons:** Manual needs work; System 7.0 will make some elements redundant. **Company:** Now Software. **Requires:** Mac Plus; System 6.0.2. **List price:** $129.

Now Utilities is a wide-ranging collection of system enhancements (most in the form of individual start-up documents, or INITs). In the August 1990 issue of *Macworld*, I compared version 1.0 to an all-in-one-box stereo system: it's functional, less expensive than buying the components separately, but even the best parts aren't anywhere near the top of the line. In response to criticisms such as these, and in recognition of the stiff competition from single-purpose utilities, Now Software has recently introduced Now Utilities

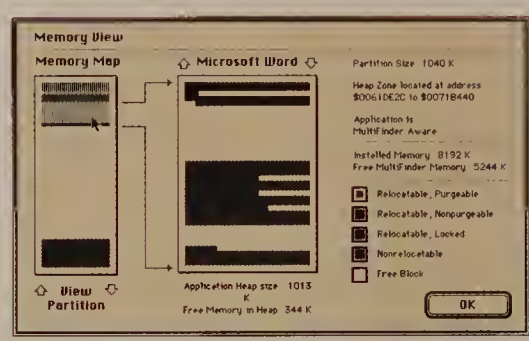
(continues)

2.03, which replaces the collection's weakest elements—InstantAccess, MemorySetter, Persistence, and RearWindow—with four new utilities: FinderKeys, Super Boomerang, MultiMaster, and Screen Locker.

FinderKeys (like RearWindow) allows you to select, move, and copy files and folders in windows that are behind the currently active window—without deactivating the currently active window. FinderKeys also lets you select files or folders in Finder windows by name, open selected folders, and if MultiFinder is turned on, launch selected applications, all from the keyboard. But be forewarned: just as FinderKeys eclipsed RearWindow, System 7 will eclipse FinderKeys with its even more comprehensive set of Finder shortcuts.

Super Boomerang replaces InstantAccess and is in direct competition with Aladdin Software's Shortcut. Like Shortcut, Super Boomerang provides quick access to all mounted drives, partitions, and frequently used files and folders. Super Boomerang also creates new folders and searches for lost files—all within an Open or Save dialog box. Unlike Shortcut, which has one somewhat inconvenient menu with submenus, Super Boomerang divides its functions among six menus that are displayed across the top of the dialog box. More important, using Super Boomerang you can also rename, duplicate, and delete files within an Open or Save dialog box; specify a default folder for any application; add a submenu of frequently used files to most applications' File menus; and compress long file names so that more of the name is visible within the Open or Save dialog's scroll box.

MultiMaster, like Icom Simulations' On Cue and Software Innovations' HandOff II, enables you to launch files and applications or switch to another active application (when MultiFinder is running) from a pop-up menu or from a special menu in the menu bar. Unlike its competition, MultiMaster does not let you move between active applications with a single keystroke, but like HandOff II, it can set aside the windows of all but the active application to eliminate MultiFinder desktop clutter. MultiMaster can also be used to reset an application's MultiFinder partition size (a function formerly performed by MemorySetter) and analyze current memory usage (see "Memory").



Memory Now Utilities' MultiMaster can show you how system and application partitions are organized under MultiFinder, and how memory is used within an individual partition.

Screen Locker, which is also available separately (for $79), adds screen-saver and security functions that were not part of the original Now Utilities collection. With its handful of relatively static screen-saver options, Screen Locker doesn't hold a candle (or a flying toaster) to the colorful and justifiably popular After Dark (Berkeley Systems) or Pyro (Fifth Generation Systems). The security part of the program shuts off the screen saver and reinstates the main screen only if you enter the correct password. You can configure Screen Locker so that a password is also required at start-up, and you can specify a set of master passwords as insurance, should you forget the main password; Screen Locker also keeps a log of attempted entries. Screen Locker is, however, a very low-level security device—anyone who knows how to turn off an INIT can easily get past it.

A new version of Startup Manager—which allows you to select which INITs run at start-up and in what order, and create different INIT configurations for use on different occasions—fixes many of the old version's flaws. For one thing, Startup Manager no longer changes the names of INITs when you ask it to alter their loading order. For another, to help you locate problem INITs, Startup Manager now allows one-time-only changes to an existing INIT configuration at start-up. Startup Manager also ensures that INIT icons display properly at start-up (a function formerly performed by Persistence), disables an INIT if it crashes during the previous start-up attempt, and provides a way—for those who know what they're doing—to reset the system heap size (a common need when large numbers of INITs are involved). Although it's not as classy or colorful as my favorite INIT utility, INITPicker (MicroSeeds Publishing), or as feature-laden as INIT Manager (Baseline Publishing), Startup Manager now gives both a run for their money.

Other parts of Now Utilities are more or less the same as in version 1.0: NowMenus adds submenus of desk accessory commands, Chooser choices, and Control Panel files to the Apple menu and adds pop-up menus to any application. DeskPicture replaces the desktop pattern with a black-and-white or color picture of your choice. AlarmsClock displays a digital clock and flashes previously recorded alarms in the menu bar. Print Previewer saves paper by displaying test documents on screen. Customizer, like the freeware program Layout (by Michael C. O'Connor), enables you to alter a variety of desktop characteristics, such as the arrangement of icons and the font used for file names. The WYSIWYG Menus utility displays each font in the Font menu in its own typeface, and groups all the fonts from one family. And Profiler creates a complete system-configuration report, which can be useful in diagnosing problems.

Altogether, Now Utilities 2.03 is a significant improvement over the original version. Although the manual is still rough sledding in places, Start-up Manager, Super Boomerang, and MultiMaster can hold their own against the best, and the other elements of the collection are comprehensive in coverage and good enough for all but the most demanding Macintosh owners. With its new, lower price, Now Utilities makes it difficult to justify the expense of collecting a half-dozen or more single-purpose utilities. Anyone who doesn't already own some or all of the alternatives and finds system utilities such as these appealing (and who doesn't?) should find Now Utilities hard to resist.

—Robert C. Eckhardt

See Where to Buy for contact information.

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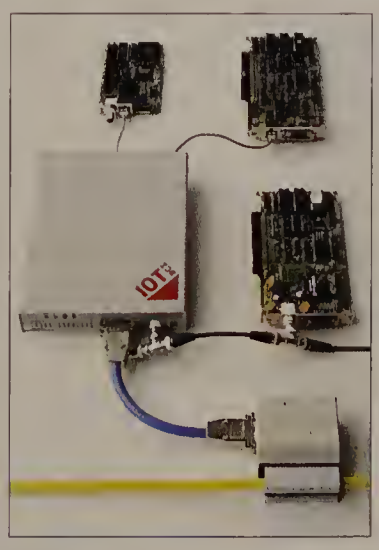

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Circle 24 on reader service card

School Administration Software

MAC SCHOOL 3.0

Pros: Flexible; comprehensive; carefully designed. **Cons:** Requires heavy commitment in training and practice; uneven tech support. **Company:** Chancery Software. **Requires:** Mac Plus; 2MB of RAM; hard drive. **List price:** $1950 to $4200, depending on options.

Mac School is by far the leading Macintosh school-management software package. It can automate, quite efficiently too, every current type of school record. The program is flexible and can be tailored to any special circumstances. It is also complete—Mac School has a module for everything, from library management to course grading to funds accounting.

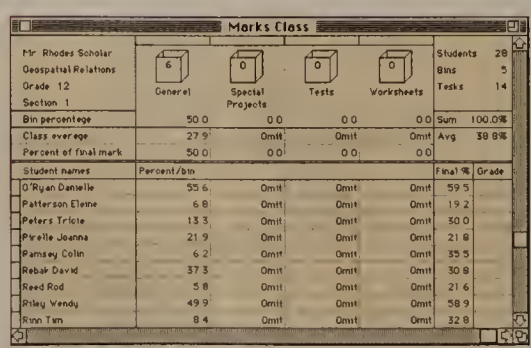
As independent Mac School consultant Doug Boehme of Hilmar, California, points out, the correct relational-database structure for the records of a school or group of schools has more and trickier kinds of links than do the more familiar client-tracking or customer vertical-market databases.

A+ for Thoroughness

One basic single-user bundle (this cost $2400 in early 1991, but price changes are expected) includes nine modules: Attendance, Report Cards, Marks, School Setup, Student Details, Report Manager, Teacher Details, Course Details, and Query. The modules are directed from the Mac School Shell, which acts as a sort of internal MultiFinder for managing all the modules active at one time. The modules themselves have two main strengths. First, they show familiarity with the smallest details of school practice in North America (see "High Marks for Effort"). Second, Query and Report Manager let you extract, view, and present any information from any of the modules in any custom format.

Mac School has anticipated most of the reporting formats you are likely to want if you don't want to design your own. For example, the Report Cards module. Besides allowing for virtually any grading details (do you want a B+ to count in the grade point average as 3.5 or 3.0?), the module lets the school set a complete range of criteria for honor roll status (no more than three tardies per semester? PE grades don't count? extra points for honors classes?). Most of the Mac School users interviewed for this review—Chancery provided a long list of references and a complete set of software for one suburban junior high school as a *Macworld* test site (and subsequent rich source of comments)—noted that with each release of Mac School (version 2.7 gave way to 3.0 as this review was written) the software's anticipation of their needs is impressively complete.

The other modules, which can be added to an existing basic Mac School setup under the Shell, are Scheduling, Library, Advance Booking, ASCII, Scanning, Guidance, and Health Records. There is an optional District Student Management program for processing records from several schools at a central district office, and a stand-alone modular accounting system called Funds Accounting. Each module makes characteristic demands and offers its own benefits. Scheduling, for example, makes all the student schedules for an entire high school. Using Scheduling for the first time can take longer than doing the same task by hand, but subsequent semester schedules can then be produced in hours. Library makes the school librarian's life a dream once it's set up. If a school already has extensive computerized records, the ASCII module allows the import of all types of record formats into Mac School.



High Marks for Effort The Marks module accommodates all sorts of grading schemes, with different ways to weight tests, homework, special assignments, and other tasks. As you would expect, the Marks module transfers grades and comments to Report Cards.

Doing Homework

Mac School offers the prospect of efficient record-keeping with potentially fewer administrative or clerical employees. This absolutely does not mean that you can mail a check to Chancery Software and make your school's problems go away. As an administrator at the test site noted, "Each complex module—Scheduling and Report Manager, for example—takes about as much effort to learn effectively as PageMaker." Schools that report the best success typically bought not just the on-site training ($2400) for a staff group, but also in-house training at Chancery in Vancouver (approximately $1600 each) for selected staffers who were then capable of training others. Another budget consideration is hardware. In principle you can run this system on Mac Pluses and link them with TOPS. In practice you need loaded SE/30s (the company recommends Classics), and a high-speed printer rather than an ImageWriter if you want to print 700 report cards at a time. All the references Chancery provided offered the same conclusion: if your school has the resources in money and staff time to get enough training, the investment pays for itself and works wonders. If you just buy the software and get minimal training, you'll have traded several thousand dollars for pretty meager results.

Report Card

Mac School gets very good marks for software quality, despite occasional minor mysteries (one school reported its ethnicity data on individual students scrambled in upgrading from 2.7 to 3.0, and Mac School's option-*key* codes don't match those of other Mac software). Chancery has also addressed the training issue with a variety of programs, none cheap but all first-rate. Customer support quality also fluctuates a bit: most sites report immediate and helpful answers to all questions, while a few complain of waiting days for calls to be returned. On balance, though, the report card is mostly A's. Chancery has done a superior job of understanding its customers' needs, and Mac School as a result is an outstanding product.

—Charles Seiter

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Network-Management Software

GRACELAN 1.1.1

Pros: Collects data from both Macs and DOS computers; can synchronize clocks over network; logs printer activity; graphically displays topology of network; workstation owner can control what information is relayed to the manager. **Cons:** Can be slow gathering data on a large network; data must be exported to a database program to create reports; searches limited to one criterion. **Company:** Technology Works. **Requires:** Mac SE or Mac II; AppleTalk network. **List price:** 50 users $395; additional 50 users $195; unlimited users $995.

This past year network managers have seen a dearth of programs that make their job easier (see "Managing Networks," *Macworld*, February 1991). Now a new tool called GraceLAN lets a manager determine who and what is on the network, as well as what software and hardware they're using, all with one program.

Query and Control

The GraceLAN application polls the network zone-by-zone to discover what devices are attached to the network. This includes Macs, LaserWriters, PCs, and other network devices such as routers and networked modems. The amount of detail about a particular workstation depends on what INIT is installed in that Mac. If Apple's Responder INIT is installed, the name (from the Chooser) and type of Mac will be displayed in GraceLAN's network map. If the GraceLAN Responder INIT is installed, the GraceLAN program obtains more information about that Mac, including system software versions, type of keyboard, NuBus boards installed, SCSI devices, monitors, INITs, and so on. (Limited information is presented by the DOS program that Technology Works provides for PCs using AppleTalk.)

Network management raises issues of user privacy. Should the network manager know everything (well, almost everything) about a network user's Mac? How can the network manager provide user support if he or she doesn't know what's on each Mac? GraceLAN offers a reasonable solution to this dilemma—part of the GraceLAN security-level INIT is a cdev with which the user can restrict what's reported back to the GraceLAN application when it queries the user's Mac. The options are Name and Machine Type Only, System Info, All Info, and Make Changes. This last option isn't a report option—it's meant as a control for updating the GraceLAN Responder or synchronizing the Mac's clock to the manager's clock.

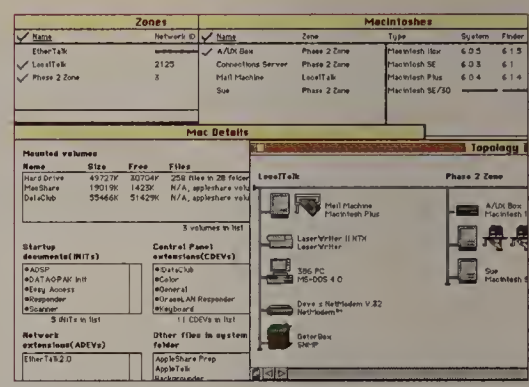
GraceLAN also offers an option for monitoring LaserWriter usage—as long as the GraceLAN administration program is running (even in the background) on the network manager's Macintosh, it can log the activity of selected printers on the network. The current version of GraceLAN creates a log that contains only the name of the user and the print job—it doesn't include other useful information such as time taken to print or the number of pages.

What to Do with It All?

It's often hard enough for a single user to keep track of what software is on the Mac. What's a network manager going to do when all this information is displayed on his or her screen? GraceLAN offers a few ways to select and present the data.

First, the manager can select network devices on an individual or zone-by-zone basis for viewing. To create a map of the network topology, you'd probably want to select all zones; on the other hand, you might only want the one or two zones that correspond to a particular department if, say, you're planning a software upgrade. Or, if you're trying to figure out why a particular Mac continually crashes with a particular INIT, you might select only that Mac for a detailed report.

Designated devices can be selected either from the network topology window or from the text window that lists those devices (there are four text windows—Macs, PCs, Printers, and Others). From any text window you can use GraceLAN's limited search capabilities to select a subset. For example, you can see only those Macs



It's All There This rather complicated screen shot displays GraceLAN's main windows. Across the top (left to right) are the Zones and Macintoshes windows. Check marks in front of a zone (or Mac) indicate items being scanned. The lower windows show the amount of detail GraceLAN can present. On the right is part of the network topology, showing a printer, 4 Macs, a DOS computer, a NetModem, and a GatorBox. The Mac Details window shows some of the information about the Mac named A/UX Box.

that have System 6.0.5 or a later version. The search facility, however, does not support any Boolean logic to allow you to couple search criteria. You cannot ask to see all Mac SE/30s that have System 6.0.5 and AppleTalk version 49, for example.

You can print or export a copy of the information for future reference. GraceLAN comes with a FileMaker II template to make the compilation a bit easier.

Being There?

One difference between GraceLAN and other competing products (such as Status Mac from Pharos Technology) is its ability to collect system information from the Macs in real time. This can mean that you have to wait until all the Macs are turned on before you can get a full report, and it can mean that a user's work is disrupted while he or she waits for GraceLAN Responder to get the information and transmit it to the GraceLAN program. The GraceLAN Responder is fairly quick, but I did notice a slowdown on some older Macs when the data is being collected. In addition, on a large network, this can mean a lot of network traffic.

If there's some doubt about a report from a particular Mac or group of Macs, you can select them for rescanning (that is, querying them for a new report). Unfortunately, GraceLAN

(continues)

PC MAGAZINE EDITORS' CHOICE
November 28, 1989
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doesn't provide an easy method for rescanning the network (or even a zone) to see if devices have joined or left the network. You have to deselect a zone (or zones) and then reselect that zone for a rescan.

GraceLAN should include an easier way to rescan a network, and it should add more-sophisticated search procedures (Boolean logic, for example) to round out some of its management options. Also, GraceLAN could increase the detail in its printer log (including the number of pages per print job, for example) and let users save a PICT file of the network topology.

—Dave Kosiur

See **Where to Buy** *for contact information.*

Screen-Capture Desk Accessory

IMAGE GRABBER 2.0

Pros: Desk accessory format; simplest of all screen-capture utilities; Timed Grab captures screens other screen grabbers can't. **Cons:** Desk accessory format; can't save to Scrapbook; Help file needs copy-editing; inconvenient to capture menus. **Company:** Sabastian Software. **Requires:** Mac Plus. **List price:** $49.

Press ⌘-shift-3, and any Mac in black-and-white mode takes a snapshot of the current screen image, saving it as a MacPaint file. Taking screen shots has always been useful to writers, manual authors, and training personnel. And magazines; you'll find screen shots all over *Macworld*.

Today, screen-capture utilities are far more convenient, because they let you specify what portion of the screen to capture. They also let you specify what format to save the image in: MacPaint, PICT, Clipboard, and so on. Joining the ranks of Exposure, Capture, ScreenShot, and other programs of this type is Image Grabber 2.0. Image Grabber, however, is a desk accessory, with its own advantages and drawbacks.

When you choose Image Grabber from the Apple menu, the pointer becomes the crosshair cursor. You drag across any part of the screen, creating a dotted-line rectangle. Anything within the bounds of this rectangle is included in the screen shot. When you release the mouse button, a dialog box appears, letting you choose the new image's format or destination. For programmers, there's also an option to save the screen shot as a resource in a new or existing file. (It would be nice if Image Grabber could also send the image directly to the Scrapbook, as its competitors do, so you don't have to name and file every single shot.)

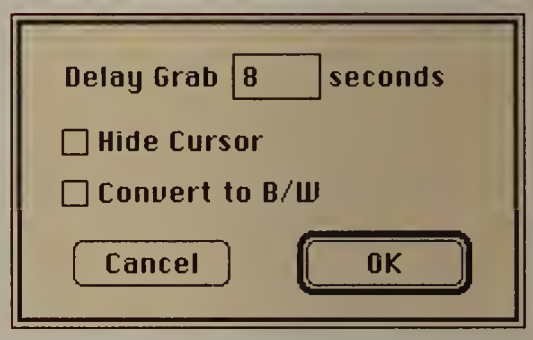
Because Image Grabber is a DA, there's nothing to clutter up the System Folder, nothing to set in the Control Panel, and no chance of conflicts with other INITs. The DA format also makes Image Grabber compatible with any Mac.

On the other hand, Image Grabber's desk accessory format makes it much more difficult to capture screen elements such as menus. With an INIT screen grabber, you can capture anything at any time, even with a menu displayed, because you can press the invocation keys even if the mouse button is down. Image Grabber's normal selection method is useless for capturing menus (and most dialog boxes, for that matter) because you have to use the mouse to choose Image Grabber.

All in Good Time

To handle these situations, Image Grabber has an option called the Timed Grab. This feature works like the Camera DA: you tell the program how long to wait before recording the screen image. So, to capture a menu, you tell Image Grabber to wait for five seconds; in that interval, you pull down the appropriate menu (see "Timing Is Everything"). At the fifth second, Timed Grab takes the shot.

The Timed Grab captures virtually anything on the screen, no matter how unruly or how irregularly written the program is. For example, Image Grabber succeeded in capturing the FlowFazer screen-saver utility. While FlowFazer is a dazzling program, its coding violates some Apple programming guidelines, making INIT-based screen-capture utilities unable to handle it. Prodigy doesn't play by the Mac's graphics rules, either; but Image Grabber captured the screen image where most INIT-type programs failed (although it crashed Prodigy in the process).



Timing Is Everything Image Grabber's most interesting feature is its Timed Grab option. This dialog box appears when you press shift while choosing Image Grabber from the Apple menu, and it lets you specify the delay before the DA captures the entire screen image.

Unfortunately, the Timed Grab captures the entire screen image; you can't isolate a menu, a window, or a dialog box. Therefore you must use a graphics program to erase unwanted screen elements before you can use the screen shot. That's a lot of trouble just for a snapshot of a dialog box.

And while we're on the topic of inconvenience, Image Grabber's online help screens—in principle, a wonderful idea—need to be copy-edited or rewritten. Not only do they contain grammatical errors and some very awkward wording, but their text is distractingly riddled with ™ and ® symbols—there's one at every occurrence of the word Macintosh, for example. (Legally, the ™ symbol must appear only at the first occurrence of a trademarked name.) Sabastian plans to address the sloppiness, as well as the limitation of the Timed Grab, in version 3.0.

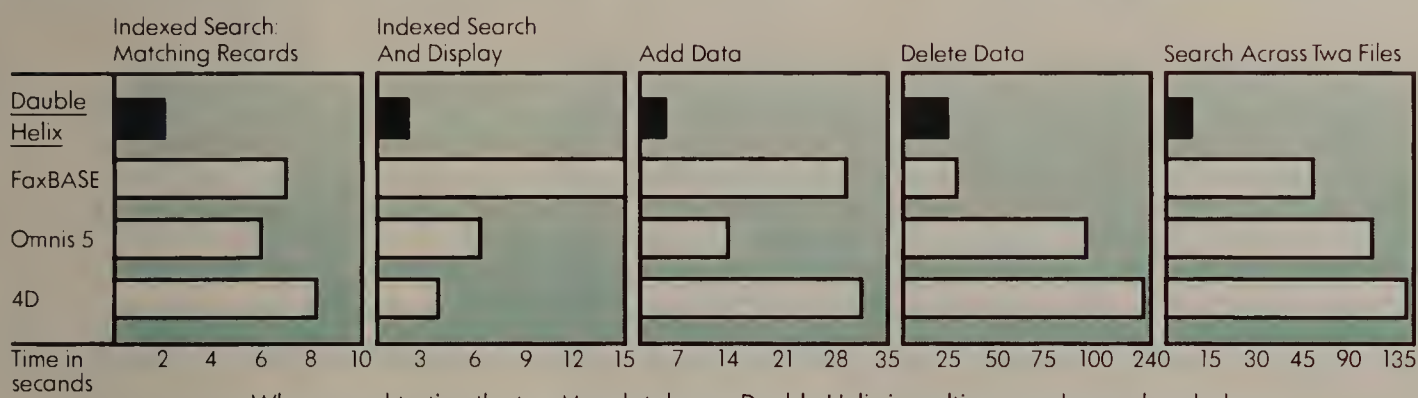
Shoot to Win

Image Grabber is certainly the easiest-to-use utility on the market, and probably the least expensive. Image Grabber is great for casual users (and programmers who'd find the resource-creation feature handy). Technical writers, manual authors, or desktop publishers, however, probably should opt for one of the more feature-laden INIT-style programs (or wait for Image Grabber 3.0), because of Image Grabber's inability to conveniently capture menus, modal windows, and dialog boxes.**—David Pogue**

See **Where to Buy** *for contact information.*

Since we know you're pressed for time, we'll skip the standard introduction and get straight to the point.

■ Double Helix is the fastest multiuser relational database for the Macintosh.® This, you should know, is not our personal assessment, but rather the conclusive results of MacUser magazine's June 1990 speed-test. And of the four top databases, in five key commands, Double Helix finished first. By considerable margins.



When speed-testing the top Mac databases, Double Helix in multiuser made wan hands down.

IMMEDIATE GRATIFICATION, RIGHT FROM THE START.

■ Here is—and we quote—what MacWorld said in May 1990: "If you need a working database by Friday morning, and it's now Wednesday afternoon...your best bet is Double Helix." Talk about fast. With Double Helix in hand and no prior knowledge at all, you can, in a matter of hours, mold Double Helix to conform to your individual needs. And as your needs change, so can, with minimal effort, your applications.

Not just built for speed: "Double Helix is the most user-friendly database currently available." MacUser, June 1990

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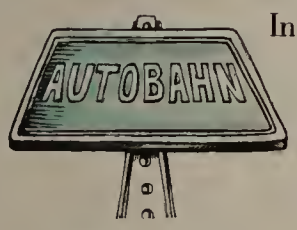

Client/server keeps everyone moving fast.

In addition to speed, client/server provides another crucial benefit: total referential integrity. In other words, when one user makes a change to the master, the whole network gets updated—in real-time. On your screen. Right then and there. So everyone has the same data. And everyone's in sync. The end result: a group that's always working in one direction—forward.

■ By the way, and for the record, we were the first ever to introduce a Mac-based client/server. And while it was revolutionary at its debut in 1986, it is, remarkably enough, still revolutionary today.

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Double Helix

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New 88 MB Removable Now Available For $797

WINDOW SHOPPING

by Lawrence Stevens

This month I look at a forms generator, a utility for printing or displaying fonts, a résumé application, two games for children, and two other products

One Shot 1.0

One Shot ($99.95 from Baseline Publishing), a forms generator, provides the tools to design invoices, report cards, receipts, and so on. It also has the spreadsheetlike ability to apply functions or formulas to any data-input fields you create, so that, for example, a field at the bottom of an invoice can automatically calculate and display the total of all purchases, or a column on a report card can display average test scores. To help you program forms, One Shot provides 150 mathematical and logical functions, almost as many as you'd find in a major Macintosh spreadsheet.

One Shot enables you to satisfy a wide range of functions using only the mouse. For example, you can enter formulas using an on-screen number pad, or have numbers appear with two places after the decimal point by pointing and clicking through pop-up menus.

One Shot is a desk accessory, so it runs even on 1MB Macs. Its forms-generating capabilities are easier to use and take less time to learn than those of Excel, Wingz, or Full Impact, and One Shot is less expensive and requires less RAM.

TypeChart 1.0

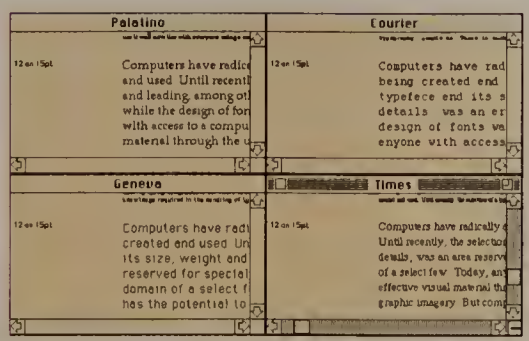
TypeChart ($99.95 from Octavo Productions) provides an easy way to print or view charts of System fonts. The program displays a dialog box listing all installed fonts. You select the fonts you want to chart and then select one of the five chart types; for example, Headline shows the fonts in sample headlines in all sizes from 16 to 127 points; Text shows them in

RON CHAN

sample paragraphs from 5 to 14 points; and Styles shows them in plain, bold, italic, bold italic, outline, shadow, condense, and underline.

The charts can be printed, displayed on screen, and shown in split-screen mode for making comparisons.

Of course, you could use a word processor to create a sample text document and format the document to show your typefaces in various sizes and styles, but that can be a time-consuming job.



Comparing Fonts One of the uses of Octavo's TypeChart is to compare fonts on screen. In this example, the screen splits into four windows, each displaying a different font.

ResumeMailer 1.01

ResumeMailer ($49.95 from Individual Software) provides many of the tools needed for a successful job hunt. Its modules help you create résumés; draft and mail inquiry, cover, and thank-you letters; remember appointments; and keep a record of job-hunting activities. The program includes a calendar, a word processor (with a good spelling checker), a mail merge feature (easier to use than Microsoft Word's), and two unique modules that help you compose résumés and letters.

To use ResumeMailer, you select one of three types: Chronological, Functional, or Performance. Each type offers several formats; for example, Chronological has eight formats including Academic, Management, and Computer Professional. The program then asks for information such as experience, education, and hobbies. Once you have entered the information, the program automatically generates a professionally formatted résumé.

The letter module includes Broadcast (or inquiry), Cover, and Thank You letters. For each letter type you choose from stock paragraphs, which you can then personalize (see "Personalizing Letters").

digiMatic 1.0

Using a digitizer or digitizing tablet you can measure objects in a drawing by selecting points on an object with an input device such as a wand, stylus, or mouse. (The manual also suggests trying a Kurta tablet or Bit Pad Plus.) Architects use digitizers to scale blueprints; machinists, to measure parts in drawings; and students, to re-create a graph found in a journal. If you can scan the drawing you want to measure, digiMatic, a $229 desk

(continues)

accessory from FEB Software, can measure the on-screen image just as a real digitizer measures a drawing on paper.

digiMatic is easy to use. You click on two points in the drawing and indicate the scale. The program then creates a table containing the numeric values of the indicated points in either tab-delimited text or PICT format.

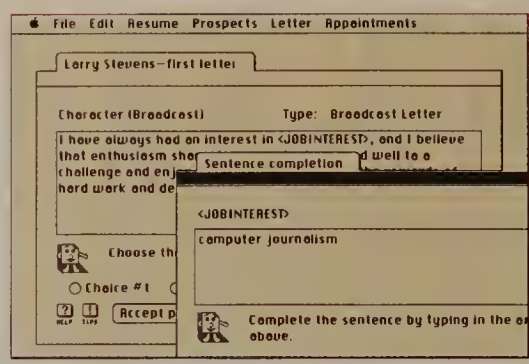
The manual does suggest two nonscanner methods of using digiMatic, but neither is entirely satisfactory. If you have a transparency of the drawing, you can tape it to the Mac screen and use the cursor, which should be visible behind the transparency, to click on the points you want to measure. Or place the drawing under the mouse and click when the edge of the mouse aligns with the points you want to measure. While I found the transparency method better than using the mouse as an input device, neither method is as precise as using digiMatic on screen. These methods might, however, be acceptable for applications that do not require absolute precision.

digiMatic is not only less expensive than a hardware digitizer, it works with all Macs, even with the older 1MB machines.

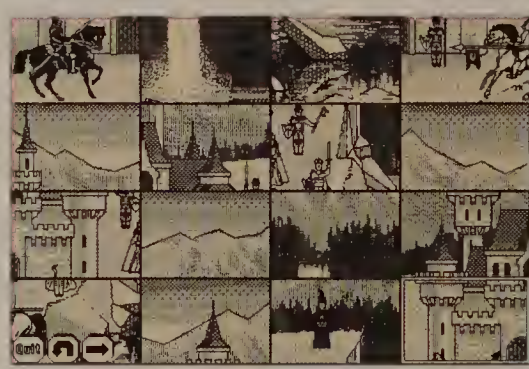
Enchanted Journey

Enchanted Journey (Jumping Frog Productions, $39.95) provides six games intended for 5- to 12-year-olds, each based on an interesting scene such as a medieval castle, a haunted house, or a city street. There are three types of games: jigsaw puzzle, memory game, and find-the-object hunt (see "Puzzling Out a Medieval Scene"). After completing each game, children can manipulate many of its graphic elements (for example, they can reposition the medieval scene's jousting knights). Enchanted Journey is lavishly animated (the animations were made with MacroMind Director) and includes excellent sound.

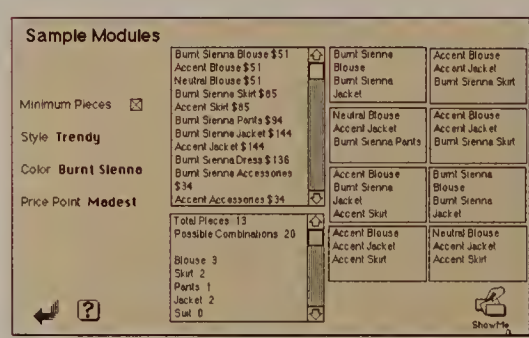
I have two quibbles with Enchanted Journey, however. I would like a variety of games; for example, why couldn't there be a different game for each scene? Second, I think most children over 10 will find the games boring compared to the video games they are used to. But for the younger set, Enchanted Journey is fun and offers practice in cognitive skills and hand-eye coordination.



Personalizing Letters To help you craft letters, ResumeMailer presents a number of stock paragraphs. Choose an appropriate one, via radio button, and the program displays phrases that you must personalize. In the above example, I replaced <JOBINTEREST> with the phrase "computer journalism" to personalize the final letter.



Puzzling Out a Medieval Scene You first select the number of puzzle pieces (8, 12, or 16). Enchanted Journey then lets you view the complete scene for 10 seconds, after which it displays a jumbled version. To win, you have to click on the square where the piece that's highlighted in the lower right corner ought to go.



Clothing Ensembles After you input some personal information, Manage Your Closet suggests purchases. You select Style, Color, and Price Point using pop-up menus (left). The fields in the middle show the items to buy. The boxes at the right list outfits that combine items.

Trick or Treat

Kindergartners through fourth graders, according to BES Software, can use this Halloween-theme game to practice arithmetic. Trick or Treat ($39.95) uses graphics and ghostly sounds to entice kids to solve addition, subtraction, multiplication, and division problems (type of problem, time limit, and difficulty level are user-selectable). For each correct answer, the child's stash of trick-or-treat candy increases; for each missed answer, it decreases.

While Trick or Treat's graphics and sound initially attract, the game is somewhat repetitive. Used sparingly, Trick or Treat is an excellent complement to an arithmetic class, but the novelty soon wears off.

Real Estate Investment Analysis 7.0

Real Estate Investment Analysis ($295 from RealData) provides complex Excel templates for analyzing real estate investment income. Taking current tax law into account, the templates help you determine cash flow and potential profit and loss on rental property. The advantage of this program is that it lets you enter a wide range of expenses and creative rental and loan options. It accepts percentage rent, for example, where the lessee (normally a retail outlet) pays a percentage of gross sales as rent. The program can also compare conventional mortgages, money notes, and rollovers.

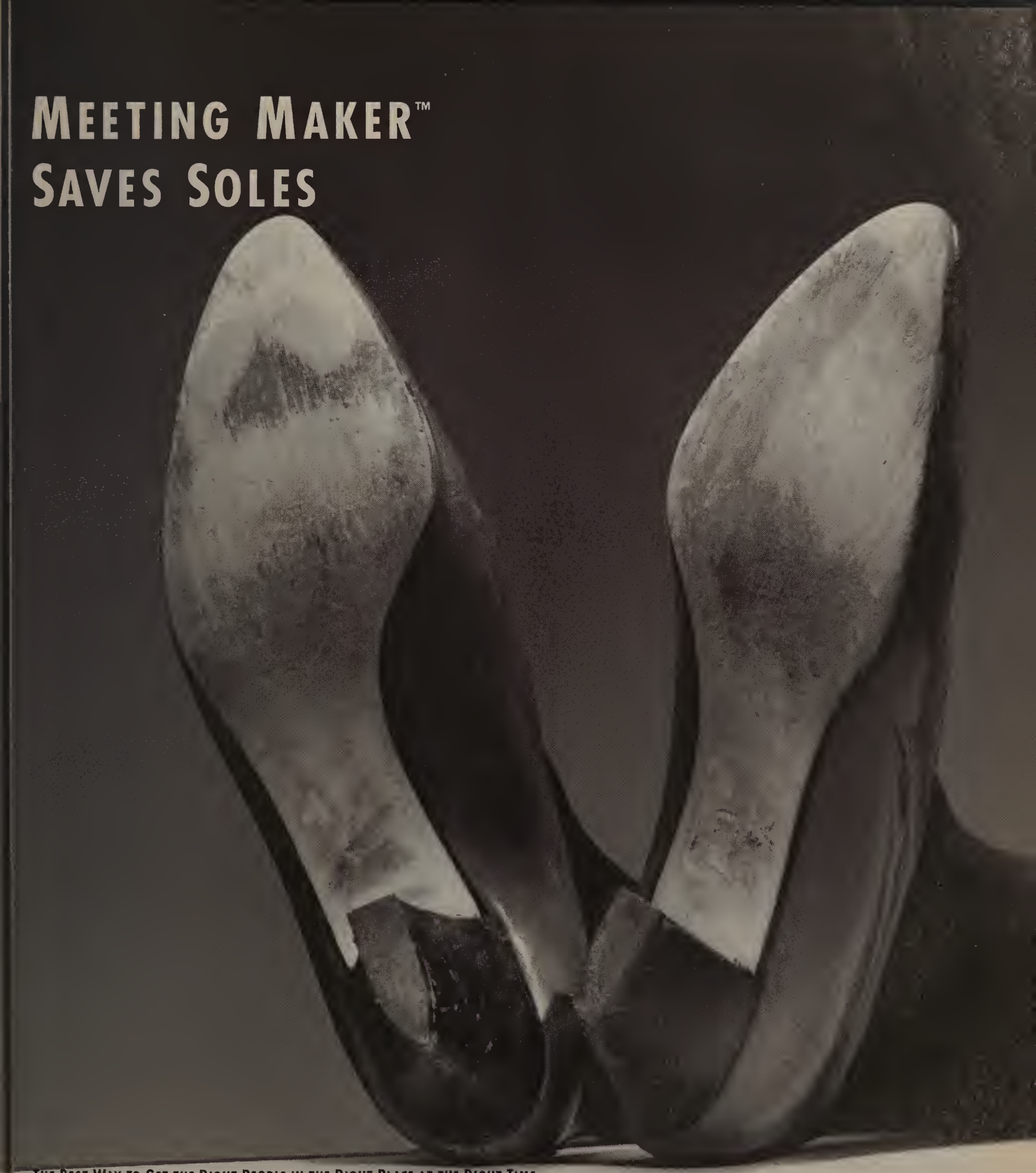
Real Estate Investment Analysis is excellent for a real estate investor who owns commercial property or a number of apartment units. For owners with one or two income properties, I recommend the simpler and less expensive Excel templates in Real Estate Analysis (Heizer Software) or the real estate sections in Microsoft Excel Money Manager (Microsoft Press).

Manage Your Closet 1.0

Manage Your Closet (MYC) is a $29.95 HyperCard stack from Woodbridge Information Solutions that helps you select clothing purchases, plan what to wear for the next 30 days, decide what to pack for a trip, and select clothing in your closet to discard. MYC stores data and offers clothing suggestions. You enter information about your body shape, coloring, clothes budget, and general style, and MYC makes purchase recommendations and generates charts of what to wear with what in your present wardrobe (see "Clothing Ensembles").

See Where to Buy *for contact information.*

MEETING MAKER™ SAVES SOLES



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If only she had SAM.™ It's the highest rated, best-selling virus protection, detection, and repair program for the Macintosh.

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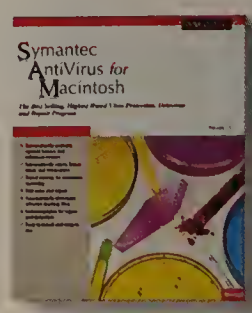
SAM halts viruses *before* they infect your system and operates invisibly in the background—interrupting you only when a virus is detected. New SAM 3.0 even repairs infected desktop files automatically, no questions asked.

And SAM 3.0 protects you from new viral strains, so you don't have to wait months for new software updates. Just call our 24-hour Virus Newsline† for free update instructions. Or download a single update file directly from Symantec.

SAM 3.0 even supports System 7.0. And best of all, it costs only $99.00.*

So before another virus makes your life miserable, pick up a copy of SAM 3.0. Call for more information.



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NEW PRODUCTS

Edited by Mary Margaret Lewis

This section covers Macintosh products formally announced but not yet evaluated by Macworld. All prices are suggested retail. Please call vendors for information on availability.

HARDWARE

84MB Removable Cartridge System

Removable cartridge system that formats to hold 84MB and uses a SyQuest drive mechanism. System has average access time of 20ms and is designed for backing up fixed hard drives or for storing or transporting large data files. System comes bundled with Retrospect Remote backup utility software. $1795. MicroNet Technology, 714/837-6033.

84MB Removable Cartridge System

AVR Scanners

Gray-scale and color scanners that emulate the Apple Scanner for software compatibility. AVR 3000/GS Plus Greyscale Scanner can scan 256 levels of gray at 300 dpi and can be upgraded to a color scanner. AVR 3000/CL Plus is capable of scanning 16.8 million colors (in 24-bit color) at 300 dpi, and scans an 8½-by-11-inch page in less than 1½ minutes. AVR 3000/GS Plus Greyscale Scanner $2090; AVR 3000/CL Plus Color Scanner $2590. Advanced Vision Research, 408/434-1115.

Cache-In

Compact cache board for the Mac IIci that, when installed, leaves room inside the IIci for a 5¼-inch hard drive. $299. Applied Engineering, 214/241-0055.

Cache-In

FlexScan Low VLF Monitors

Series of color monitors that are compatible with the Macintosh II. Models 9080i and 9400i have intelligent controls that enable user to adjust the horizontal and vertical scanning frequencies to meet the requirements of specific applications. Can save frequency settings; monitors remember up to 24 combinations. Model 9080i has 16-inch display; model 9400i has 20-inch display. Both models support 24-bit color. 9080i $1929; 9400i $3899. Nanao, 213/325-5202, 800/235-2202 outside California.

FlexScan Low VLF Monitors

LaserScript LX

Six-pages-per-minute, 300-dpi, PostScript-compatible printer. Both Mac and IBM PC-compatible. One paper tray handles both letter- and legal-size paper; prints on labels, transparencies, stock paper, and envelopes. Comes with 2.5MB of memory that is expandable to 4.5MB. $1995. Abaton, 415/683-2226.

LaserScript LX

PaintWriter Printer

180-dpi personal color inkjet printer that comes with a QuickDraw printer driver designed for screen-to-printer color matching. Printer has throughput speed three times faster than that of the HP PaintJet printer. $1395. Hewlett-Packard, 415/857-1501.

PaintWriter Printer

ViewFrame Spectra Projection Panel

Color liquid-crystal-display projection panel projects computer graphics and data when placed on a standard overhead projector. Active matrix LCD yields colors with high contrast to make the panel suitable for animation. $5995. nView, 804/873-1354, 800/736-8439.

ViewFrame Spectra Projection Panel

Xante Accel-a-Writer

Printer-resident controller that lets user allocate memory to increase printer resolution and processing speed, and allow more virtual memory to download fonts. Available in three versions. Accel-a-Writer I upgrades the original LaserWriter and LaserWriter Plus; Accel-a-Writer II is for LaserWriter II printers, and Accel-a-Writer III upgrades the Personal LaserWriters SC and NT. $2495. Xante Corporation, 205/990-8189.

SOFTWARE

4th Right

Collection of 80 external procedures that are designed to extend 4th Dimension's capabilities in

(continues)

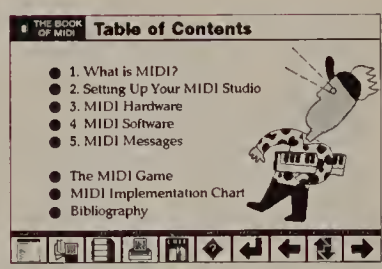
using AppleTalk, arrays, buttons, the Clipboard, variables, utilities, and windows, as well as its capabilities in creating strings and printing. 2MB min. memory. $195. Digital Concepts, 503/244-4460.

All the Right Type

Classroom tool for teaching students computer keyboard skills. Designed for grades 4 through 12, and can also be used for adult classes. Program comes with practice session, or teachers can make up their own. Includes built-in word processor. 512K min. memory. Didatech Software, 604/299-4435, 800/665-0667.

The Book of MIDI

Interactive HyperCard stack providing an overview of MIDI, computers, synthesizers, and music,



The Book of MIDI

and describing how they relate. Does not require MIDI hardware. 1MB min. memory. $39.95. Opcode Systems, 415/369-8131.

The Continuous Image Photometry System

Image-analysis and photometry system that is capable of processing multiple simultaneous images for use in applications such as animations. Creates a continuous video image composed of multiple full-screen frames, keeping all the segments to scale. Program uses image-enhancement functions such as color filtration; RGB color identification; zoom; pan; overlay; subimage insertion; and automatic and manual feature recognition, modification, and measuring. System includes Video Frame Grabber software for a RasterOps board, but does not require a frame grabber board. 3MB min. memory. Application $565; with interface for accepting user-written routines $1835. Visionalysis, 401/624-9214.

ElseWare BarCode Kit

Bar-code utility for creating and printing industry-standard Postnet bar codes, postal FIM bars, Code 39 bar codes, UPC packaging symbols, and two of the five main shipping bar codes. Includes PostScript fonts that can be used with most database, page-layout, and word processing programs. Includes ZipBars font, a HyperCard stack for creating Postnet bar code–EPS files, and ZipFix digit-calculating utility. Also has templates for MacWrite, Word, PageMaker, QuarkXPress, FreeHand, and Illustrator that indicate where to place Postnet bar codes and FIM bars on an envelope. 1MB min. memory. $179.95. ElseWare, 206/547-9623.

Enchanted Journey

Animated software for children that includes six fantasy worlds complete with graphics, digitized sound, and mobile figures

Enchanted Journey

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The complete PostScript® printer

No matter which Mac you pick, we've got a PostScript printer to go with it. Personal or shared.

Home office. Home run. Take the 6 ppm microLaser PS17. At only $2,144*, it's ideal for home or professional use, giving you 17 Adobe® PostScript scalable fonts.

Plus it's only 13.4″ wide and 14.2″ deep – a natural deskside companion for any Mac. In fact, *MACWORLD* says, "The likable little microLaser is the best all-around value."†

Company office. Great company. For more power where power counts, there's the $2,644* microLaser PS35 with 35 scalable fonts. *MacUser* calls it "The clear winner in the personal printer category....It gives you more bang for the buck and outperforms all its competitors in most performance tests."‡

Shared office. Shared printer. Now here's the right match for one Mac or many. In fact, the 16 ppm microLaser XL is a natural fit for an AppleTalk® network. And like its slightly smaller cousin, this workhorse printer offers you either 17 or 35 scalable fonts, priced at

for creating individual stories and scenes. The child enters the fantasies through one of three games (memory, hidden-object search, and puzzles); there the child can drag figures around the screen. Double-clicking starts one of the more than 100 animations that are hidden throughout the scenes. 1MB min. memory. $39.95. Jumping Frog Productions, 801/451-0517, 800/523-3764.

FastTrack Resource

Resource-allocation tool for managing people, rooms, equipment, time, activities, and services. Creates resource reports that can be formatted as Gantt charts, histograms, resource tables, activity tables, or combinations of these. 1MB min. memory. $235. AEC, 703/450-1980, 800/346-9413.

FastTrack Resource

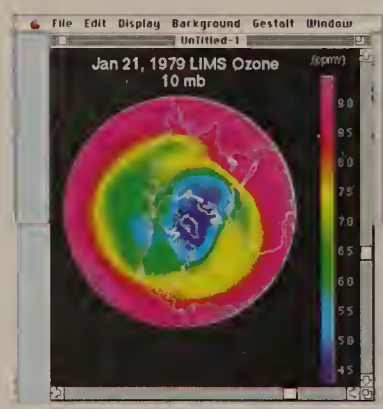
The Geometer's Sketchpad

Tool for teaching geometry on the Mac. Designed to help teachers and students construct figures—from simple textbook figures to working models of the Pythagorean theorem—and to create perspective drawings, fractals, and animated sine waves. Includes text capabilities that enable students to title, label, and annotate their work. Uses on-screen recording feature to create scripts of constructions, and can be used in conjunction with an overhead projector to illustrate classroom geometry lessons. 1MB min. memory. Single-user version $169.95; ten-user lab pack $399.95. Key Curriculum Press, 415/548-2304, 800/338-7638.

The Geometer's Sketchpad

GraphicsVu

Graphics filter that reads ANSI-standard graphics metafiles and displays any metafile images on screen.



GraphicsVu

Runs in color. Images can be saved to disk as PICT files and can be edited with draw or paint programs. 4MB min. memory. $125. Perkland Associates, 215/889-1674.

Greek Practice

Language software that has been designed for use with text-book courses on biblical Greek. Program intended for beginning, intermediate, and advanced students of the Greek lan-

(continues)

Pick a microLaser.™

Family solution from Texas Instruments.

$4,144* and $4,644*, respectively.

Mac and microLaser. The perfect pair. Whichever microLaser you pair with your Mac, there are bonuses microLaser offers that other printers can't. Like easy-to-use controls and upgrades you can do yourself – without tools or technicians. And because it's compatible with the Apple LaserWriter®, microLaser works like it was made for the Mac. Even when you use its multiple paper trays, because each microLaser comes with TI's Paper Tray Manager software.

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TEXAS INSTRUMENTS

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guage. Package comes with 15 HyperCard stacks that can be used as flash cards for vocabulary and grammar practice. Helps student review inflections as well as parts of speech. Written by Dale Russell Browne. 1MB min. memory. $69.95. Duke University Press, 919/684-2173.

International Graphics Library CD-ROM

More than 200 CD ROM images for use in multimedia presentations and desktop publishing. Contains images of currency, stocks, dollar symbols, coins, and gold bars; maps and flags of numerous countries; outlines of the 50 states; the earth, as it looks from the moon; and images of United States presidents. Images are in 24-bit color TIFF, gray-scale TIFF, and other formats. 2MB min. memory. $299. Gazelle Technologies, 619/536-9999.

MacEDI

Software that provides a Mac interface to the Electronic Data Interchange (EDI) protocol. Takes files from 4th Dimension or Excel and translates them into the EDI format for transmission with communications software. 2MB min. memory. $1950. Digit Software, 301/593-8952.

MacNumerics

Mathematics program designed for mathematics students at the high school and university levels. Includes 12 tools that cover basic requirements for calculus and other higher mathematics, beginning with graphs and points in the Cartesian coordinate plane, and continuing on through integral and differential calculus. Program displays function graphs that depict roots, slopes, and areas. 1MB min. memory. $189.95. Spring Branch, 319/927-6537.

Mac-To-Mac

File-transfer and text-conferencing software that consists of FileShare and TextPhone DA. Operates over AppleTalk network and enables users to send or retrieve any number of files in the background, and to initiate a two-way text conversation. Includes answering machine and message center capabilities. 1MB min. memory. 5-pack $250; 10-pack $350; 50-pack $1500. Caravelle Networks, 613/596-2802.

Manage Your Closet

Software to keep track of your wardrobe; assist you in planning what to wear; and advise you on which items might have been good buys, which should be worn more frequently, and which work well together. 1MB min. memory. $29.95. Woodbridge Information Solutions, 415/424-9051, 800/522-5939.

MathCard

HyperCard-based mathematics program that is designed to assist children in learning to add, subtract, multiply, and use a calculator. Program uses a series of flash cards, a pop-up calculator, and aural and

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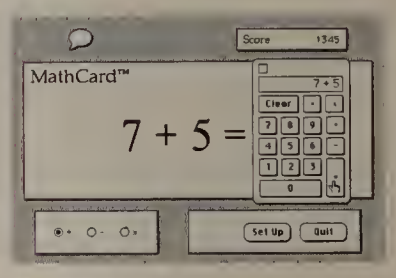

MathCard

SuperANOVA

If you analyze data using general linear models (ANOVA, ANCOVA, MANOVA, MANCOVA or regression), you should be using SuperANOVA™. SuperANOVA is a revolutionary approach to data analysis, combining powerful statistics with full presentation graphing features.

Critics have been unanimous in their praise for SuperANOVA:

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"The interface is as elegant and intuitive as I have ever seen in a program of this complexity." —*MacUser*

"SuperANOVA has simply set a new standard for classical general linear models programs." —*BMUG Newsletter*

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Heavy duty 10' steel cable secures and locks computer, printer, other equipment, up to 4 components. The unique ***MacKablit*** system includes 2 brackets that snap into existing slots on the Macintosh or its peripherals. Additional hardware included for other peripherals that can be secured using existing screws in the equipment. Internal component security: ***Kablit***™ fasteners secure rear panel of CPU preventing unauthorized removal of internal boards and hard drives. When the cable is passed through the fasteners the screws are concealed. When the cable is passed through all the fasteners the Macintosh system can be secured to the desk.

List price **$39.95** plus shipping. Please specify **Mac, Mac Plus, Mac SE, or Mac II.** Quantity pricing also available. Money back if returned in 30 days. Purchase orders accepted. Send for catalog.

***Kablit* security systems also available for most computers.**

Secure-It, Inc. 18 Maple Court • East Longmeadow, MA 01028

1-800-451-7592 **Dealer inquiries invited.**

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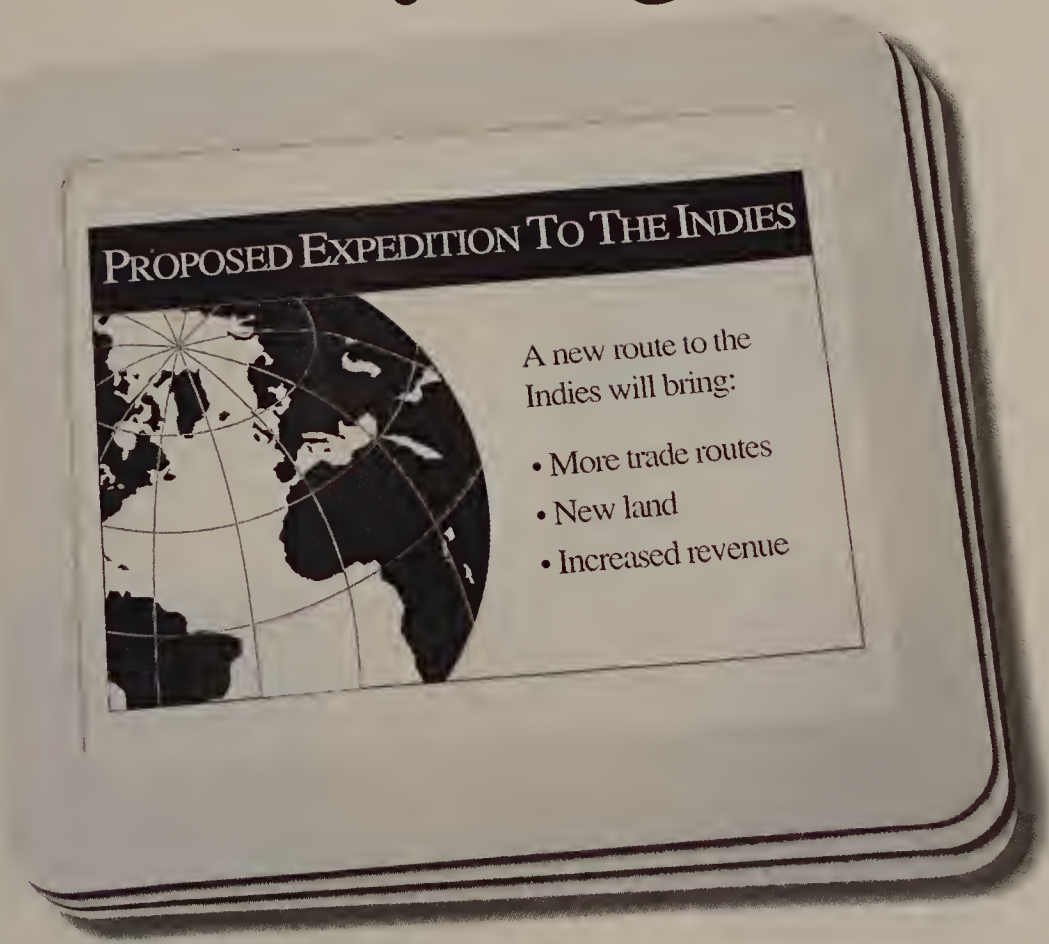

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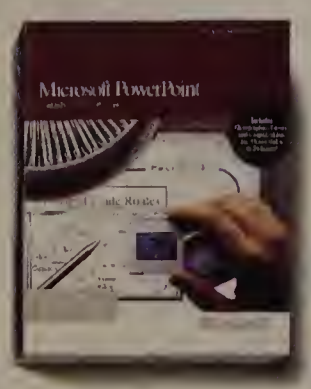

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visual feedback to teach fundamentals of mathematics. 1MB min. memory. $14.95. Arch Cape Software, 301/680-8004.

MIDI TrackLog

HyperCard-based utility for musicians, composers, and musical arrangers. Provides inventory of keyboards, sound modules, controllers, and instruments used in creating and arranging a song. Organizes patches, cable and channel assignments, and track comments; produces centralized, user-updatable track reports for each song, sequence, or recorded cue. 2MB min. memory. $39.95. Intervision Software Company, 714/534-6278, 714/530-4178.

Mr. File

Desk accessory alternative to the Finder that copies, erases, and searches in the background, and performs standard disk-management operations. Lets user customize the way files are grouped regardless of which disks they reside on. 1MB min. memory. $99. Softways, 408/978-9167.

NetMinder LocalTalk

LocalTalk network-analysis tool that includes packet decoding and packet collection using filters and triggers. Features include data capture, data analysis, and the ability to decode all AppleTalk protocols including ATP, RTMP, ADSP, ASP, PAP, NBP, MacIP, and Netway 1000. Packets can be selectively captured using filtering criteria such as protocol type, source and destination address, and protocol data. 2MB min. memory. $395. Neon Software, 415/283-9771.

Personal Training for QuarkXPress 3.0

Five audiocassette- and disk-based tutorials for self-paced, interactive instruction for QuarkXPress 3.0 page-layout program. Each tutorial consists of 90-minute audiocassette, practice disk, and command summary card. Tutorials consist of Beginning QuarkXPress, Master Pages, Text Formats, Color & Type, and Tips & Techniques. 2MB min. memory. $79.95. Personal Training Systems, 408/559-8635.

Professional Medical Practice Management

Series of four medical-practice–management modules: DC (Doctors of Chiropractic) Plus, MD (Medical Doctors) Plus, DO (Doctors of Osteopathy) Plus, and PT (Physical Therapists) Plus. Each module is an integrated medical accounting system with specialized billing for the medical practice. Package generates a variety of reports, lets practitioner search database using a specialized set of criteria, and processes electronic claims for submission to insurance carriers. 2MB min. memory. Each module $2995. Hamilton Computerized Business Solutions, 800/445-9918.

QPID

An office-automation and office-management program designed for client tracking, scheduling, time billing, and appointments. Generates quotations, invoices, and purchase orders; also produces user-defined reports, mailing labels, and graphs. Exports and imports data to and from word processors and

spreadsheet applications to create mail merge documents, summary records, and sales lists. 1MB min. memory. Single copy $695; five-pack $2500. GT Omnicom, 416/365-1436.

Southwest Collection

EPS clip art collection containing eight volumes of illustrations representing southwestern themes. Includes borders, pottery and baskets, rugs and blankets, jewelry, kachina faces, garments, bead design. 1MB min. memory. $129.95. Grafx Associates, 602/327-5885, 800/628-2149.

Southwest Collection

Svinga

Illustrated multimedia trek through the country of Zimbabwe. Contains more than 3000 pages of text plus over 1000 maps, pictures, and drawings. Includes information about Zimbabwe agriculture, animals, insects, birds, fish, arts, culture, economics, geography, history, towns, villages, and archaeological sites. Describes 75 national parks and safari areas. 1MB min. memory. $99. CD-ROM Inc., 303/231-9373.

The Translator

English-to-Japanese language translator for the Mac. Translates 10,000 to 20,000 words per hour. Documents can be typed in or scanned with an optical character reader and imported using a Mac desk accessory. Translator's standard dictionary holds 25,000 words and can be customized. Program requires 20MB hard drive and the Japanese Kanji-Talk Operating System. 2MB min. memory. $1799. Qualitas Trading Company, 415/848-8080.

Vette

Street racing game in which players drive one of four Corvette models through a simulation of the streets of San Francisco. Cars are maneuverable and are equiped with a rearview mirror so players can check for police. Game provides three levels of difficulty. Players on two computers hooked via an AppleTalk network or using modems can play each other. 1MB min. memory. $59.95. Spectrum Holobyte, 415/522-3584.

Vette

VideoClips

Application for recording, editing, and playing back live video sequences. Allows user to store and retrieve digitized video sequences. Frame rate, resolution, and size are user selectable. Video-capture rate, window size, and duration of a sequence are limited by hard drive capacity and throughput. 4MB min. memory. $295. Workstation Technologies, 714/250-8983.

WordScript

Utility designed to turn Microsoft Word into a

(continues)

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script-writing tool. Uses style sheets for writing screenplays, television scripts, two-column A/V scripts, and storyboards. Uses automatic on-screen formatting and editing, and contains styles for different script elements such as dialogue, character names, and scene descriptions. Also has templates for screenplays, three-camera scripts, two-column scripts, title pages, cast lists, and revision pages. 1MB min. memory. $12 plus $5 s/h. WordScript, 319/339-0913.

ACCESSORIES

Jukebox Five

Automatic disk handler that attaches to the front of a floppy drive and automatically feeds and ejects up to 15 floppy disks. Device takes an ejected disk, drops it into a bin, then feeds another. Includes software that formats a stack of disks with one command. Duplicates a series of files from a master disk. $239. Fifth Generation Systems, 504/291-7221, 800/873-4384.

Macintosh Memory Key

Customized software-protection device; connects to a 25-pin SCSI port and operates transparently when hard drives or other devices are plugged in to the device. Software's encryption code can be incorporated into a developer's product using an accompanying interface written in the language of the application to be protected. 128K min. memory. $59.95 per unit. 10-unit minimum. Protech Marketing, 704/523-9500, 800/843-0413.

Macintosh Memory Key

Mini Vacuum Attachments

Vacuum cleaner attachments for cleaning computers, typewriters, and office machines. Includes 36-inch tube that attaches to the end of a vacuum cleaner hose, a brush for small items and keyboards, a straight and a curved extension pipe, and a crevice tool. Works with any vacuum cleaner with detachable hose. $10.87. The Eureka Company, 309/828-2367, 800/525-9991.

Power Wagon

Mobile Macintosh cart with casters and wheels; made of anodized aluminum; comes with an adjustable keyboard and mouse platform. $1350. Automatic, 312/733-6777.

Power Wagon

To have your product considered for inclusion in *New Products*, send an announcement with product name, description, minimum memory, peripherals required, pricing, company name, and phone number (and two copies of software) to New Products Editor, *Macworld*, 501 Second St., San Francisco, CA 94107.

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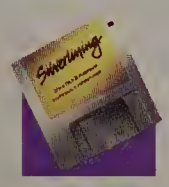
But all the way to the back (which is why we named this hard drive Bacster™). And it does have a tendency to go unnoticed.

What doesn't go unnoticed is the Quantum drive inside with effective access times as low as 8ms* and 50, 100 or 200 MB capacities.



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- **Free delivery**

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If anything goes wrong with your Bacster Quantum drive, call La Cie. We'll repair or replace it immediately, and renew the warranty for another two years.

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nuBASE™ FOR THE MAC

A Powerful Relational Database

Thanks to the Mac, Relational databases no longer require a team of programmers to create custom applications. And to prove it, we're making this offer:

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Offer valid only through New Era Software

nuBASE allows you to create distinct relationships between independent files and records. Your files will actually communicate with one another. One entry can perform multiple tasks.

Create customized reports and entry screens that combine information from multiple files. So the next time you're studying your customer files trying to determine who's buying what, when, where, and how ... you'll know with the click of a mouse.

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Quick Tips

Nixing the LaserWriter start-up page, plugging in abroad, time and date stamps in Wingz footers, and more

BY LON POOLE

Did you ever wish you had another hand to press the shift key while clicking to select multiple objects in the Finder or a graphics program, or the ⌘ key while doing repeated copy-and-paste operations with the ⌘-C and ⌘-V shortcuts? Try using the Sticky Keys feature of Apple's Easy Access software, which comes with the Macintosh system software. You install Easy Access by dragging its icon to the System Folder (with System 7, the Finder puts it in the Control Panels folder) and restarting. "Third Hand" explains how to use the Sticky Keys feature.

Unexpected Turn-on

Q I just bought a Mac IIci with 4MB of RAM, an 80MB hard drive, an Apple 13-inch color monitor, and a Datadesk Switchboard keyboard. I love the setup but lately I think gremlins inhabit my IIci. It frequently turns itself on, usually when I shut off the machine with the power switch after a bomb. Unplugging the keyboard doesn't help; I have to unplug the computer itself. My dealer has never heard of this. Any suggestions?

Mark Astmann
Ridgewood, New Jersey

A Rotating the power switch while pressing it locks it in the on position. Apple put lockable switches on the IIci, IIcx, and IIsi so those models could be used as unattended file servers that would automatically restart after a power outage. Make sure the power switch is unlocked. After you press it to shut off your IIci, it should pop out completely and the notch in it should be horizontal.

Too Many Files Open

Q I have erratic problems printing from my Mac IIci, often getting the message "Error –42" or "Printer cannot be opened." I usually have Microsoft Word 4 open, along with Omnis 3 Plus, and use Apple's PrintMonitor software for background printing. Sometimes quitting Omnis 3 lets me print from Word 4. If that doesn't work, I try saving my Word documents, quitting Word, and then opening again. Other programs such as ReadySetGo 4.5 have similar printing problems. I don't seem to have trouble printing from an SE (upgraded with a 68030 accelerator), which is a TOPS server on the network.

The IIci has three partitions on its hard drive and one folder from the server. In addition to TOPS, the Mac has Tempo II, DiskExpress II, and Suitcase II. Can I avoid this problem? My Apple dealer is stumped.

H. Willy Chu
Dunn, North Carolina

A Trying to open too many files at once causes the problems you describe. The Mac normally limits the number of files open concurrently to 40. That may seem like a lot, but everything you mentioned opens multiple files. Each open program means at least one open file. Each open Word document means two additional open files (one for the document and one for a temporary work file). Omnis 3, like any relational database, opens several files. Every disk or server icon on your desktop counts, and so do all the suitcase files you have open. Small wonder the printing software can't open a new file in which to save page images for background printing. Unfortunately, very few application programs handle this increasingly common situation with any grace at all.

Fortunately, you can use Suitcase II (Fifth Generation Systems, 504/291-7221 or 800/873-4384) to modify your start-up disk to increase the files-open limit. Follow the instructions in the Suitcase II manual for increasing the number of open suitcase files; this has the effect of increasing the limit of open files. You can also increase the limit using the Set File Count utility that comes with MasterJuggler (ALSoft, 713/353-4090).

Traveling Mac

Q Your new book gives some useful information about using your Mac in other countries. For example, I

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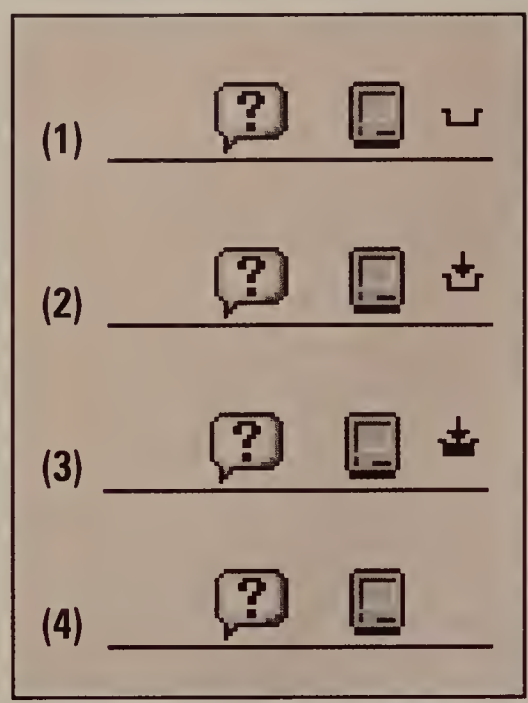

THIRD HAND When you need a third hand to press one or more modifier keys—⌘, shift, option, or control—activate Sticky Keys. A symbol at the right end of the menu bar reports the Sticky Keys status (System 7 also gives you audio feedback). Here's what you'll see on screen when you (1) turn on Sticky Keys by pressing the shift key five times quickly; (2) press a modifier key you want held down, or press additional modifier keys and then a letter or number key (for a combination keystroke); (3) press a modifier key twice, with a slight pause between presses (to lock it down); (4) turn off Sticky Keys by pressing shift five times again.

didn't realize that both my LC and my monitor work at 220 volts, 50Hz with nothing more than an adapter plug. You also mention that I can get the transformer my ImageWriter I needs from Electronics Plus. Where is it?

Matthew A. Neuberg
Swarthmore, Pennsylvania

A True, the LC has an international power supply and so does Apple's 13-inch, 640-by-480 color monitor. However, the 12-inch, 512-by-384 color monitor commonly used with the LC requires 120 volts, 50Hz to 60Hz. To use the 12-inch color monitor with 220-volt power, you need a good-quality, grounded, isolation step-down transformer that changes 220/240 volts to 110/120. Other Apple equipment that requires a transformer: Mac 128, 512, Plus, and Classic; LaserWriter II series; and Personal LaserWriter series. Check the nameplate or owner's manual of each piece of equipment for acceptable voltage and frequency ranges (in hertz).

The transformer should be rated to handle the total wattage of all equipment you attach to it. If you use a cheap voltage converter, it will ruin your equipment. You may be able to find a transformer at a local electronics supply store, or you can order one from Electronics Plus (800/321-4524 or 415/457-0466). (At this writing, Radio Shack did not carry them.)

Also, take along a multioutlet power strip with surge protection. You'll have a tough time finding one after you leave the country.

LaserWriter Start-up Page

Q I've heard I can configure the LaserWriter so it does not print a start-up page every time it is turned on. How?

Bill Pope
Cambridge, Massachusetts

A You can turn the start-up page off (and on again) using the Widgets utility program, which is part of MockPackage Plus Utilities from CE Software (515/224-1995 or 800/523-7638). Also, a LaserWriter Font Utility program that lets you control the start-up page may be included with Apple's System 7 software package (it was distributed with prerelease versions); ask your Apple dealer.

Macintosh 101

Q I'd like to learn how the basics of Macintosh system hardware and system software are designed and how they interact. The level of complexity I desire is comparable to that of a *Macworld* feature article.

Roger F. Anderson, Jr.
Raleigh, North Carolina

A Read the book *Technical Introduction to the Macintosh Family* (Addison-Wesley, 1987). Although it doesn't cover the latest hardware and software developments, it clearly explains the concepts behind the Macintosh user interface and ties the concepts to the ROM toolbox. The book also clarifies Macintosh graphics, system software, files and volumes, memory management, operating system, resources, and hardware.

The book is aimed at experienced users and novice programmers. It doesn't assume you know how to program or will ever want to. All special terms are carefully defined, making the book easy to read.

A Few Bytes More

TIP: Recently I needed to copy files to floppy disks, only to have the Finder tell me that "the file is too large" by 1K or some small amount. The floppies had seen some file shuffling, which can enlarge the desktop file, and I remembered that rebuilding the desktop file can free up some disk space. I tried it and it freed up enough space to copy the necessary files over.

Adam Frix
Columbus, Ohio

To rebuild the desktop file on a floppy, press ⌘-option while inserting the disk. For a hard drive, keep pressing ⌘-option during start-up until the Mac asks if you want to rebuild the desktop on that hard drive.—L.P.

Original Zero

TIP: Often I need to reset the zero point of PageMaker's rulers to its original position, after moving it to measure an object. (It seems like it would be a trivial addition to allow resetting the zero point by double-clicking the intersection of the rulers.) For a long time I would manually drag the zero point back there. Finally the secret was revealed to me. You simply choose Page Setup from the File menu, make no changes, and click OK.

Sterling Ledet
Powder Springs, Georgia

Quark Recovery

TIP: Since surviving the pain of document losses, I have discovered some methods for recovering QuarkXPress 3.0 documents. If a document freezes and precipitates a crash when you scroll or manipulate one of its pages, the document file is bad. Get around this by dragging its thumbnail-view pages into a new document with the same page setup. The master pages come along for the ride.

If you get a "Bad File Format" error when attempting to open a document, that document is history. You can recover most of the text with Microsoft Word's Open Any File command. *[To get at that command, press the shift key while pulling down*

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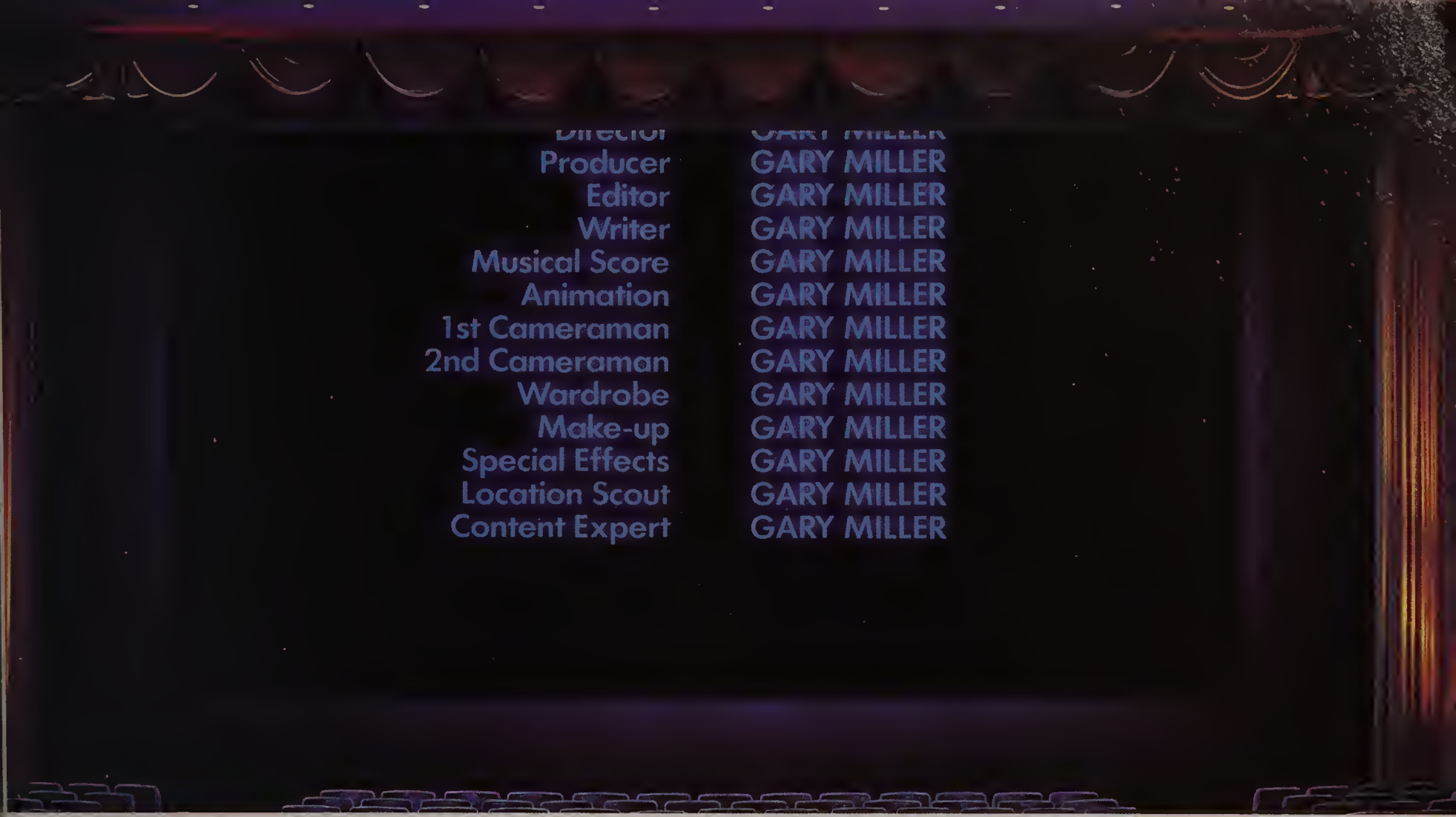

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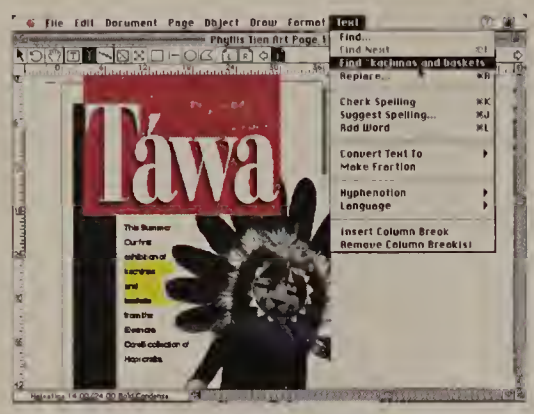

EASY READER **Take advantage of DesignStudio's Find command (Text menu) to easily read up to 20 characters of text that's too small to read in place.**

Word's File menu.—L.P.] The text may be somewhat scrambled and will contain garbage, but that beats Quark tech support's response: the total demise of the document forever.

Kim Baker
Mesa, Arizona

Quick Check

TIP: To check a small portion of DesignStudio text that is difficult to read on screen (type smaller than 8 or 9 points), select up to 20 characters with the I-beam tool and look at the third item of the Text menu (see "Easy Reader"). Your selected text appears as part of the Find command there. You save time by not having to change the page magnification.

Jonathan Macagba
Philadelphia, Pennsylvania

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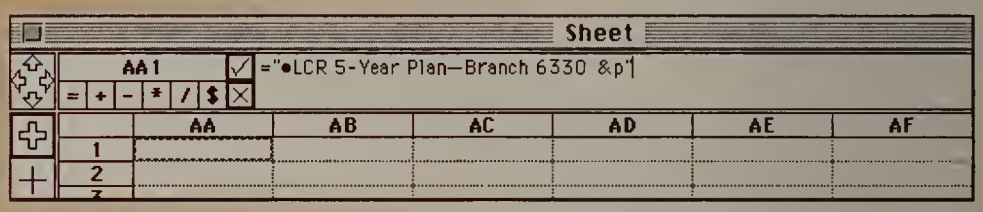
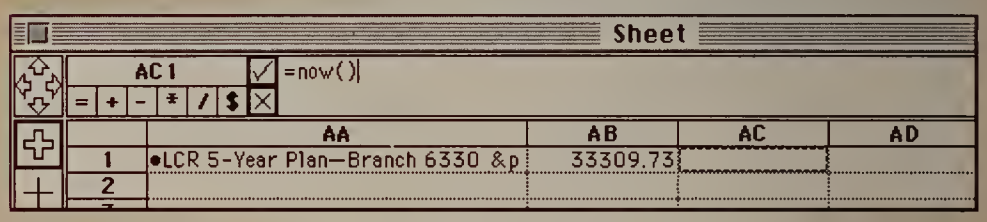
Lon Poole answers readers' questions and selects their tips for this monthly column. His two most recent books are Amazing Mac Facts *(Microsoft Press, 1991), a collection of the best published tips; and* Macworld Guide to System 7 *(IDG Books, 1991).*

TIME AND DATE STAMP

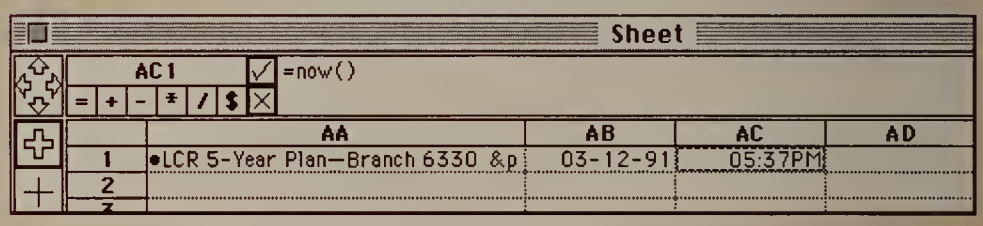
Taxes, reorganizations, and "let's make one more small change in this spreadsheet before it goes to committee" are givens in the corporate world. So how do you keep track of which one is the most recent version? Although most word processors feature easy time and date stamping in footers, spreadsheet developers generally seem to have considered it a low priority. Robert H. Blalock of DFW Airport, Texas, suggests this method for adding automatic updating to a Wingz page footer.



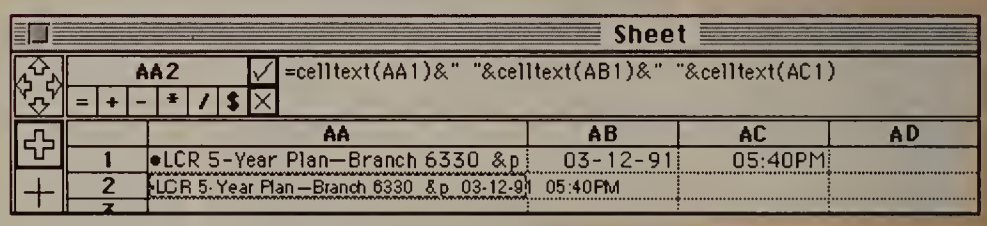
1. Enter the spreadsheet name and the Wingz auto-page-numbering code, `&p`, into a cell (AA1 here).



2. Enter the formula `=now()` in two other cells (AB1 and AC1 here).



3. Under the Number submenu of the Format menu, apply the MM-DD-YY format to the first cell (AB1 here) so it shows the date of the most recent change to the spreadsheet. Apply the HR:MN AM format to the second cell (AC1 here) so it shows the time of the most recent change.



4. Combine the contents of the three cells as text in a fourth cell (AA2 here) using the celltext() function and the concatenation operator. Make that cell the footer by selecting it and choosing Report Footer Range and then Report Footer Right (or another of the footer alignment commands) from the Report submenu of the Sheet menu. Then choose the font, size, style, and other attributes for the footer from the submenus of the Format menu.

5. This is how your finished page footer should look.

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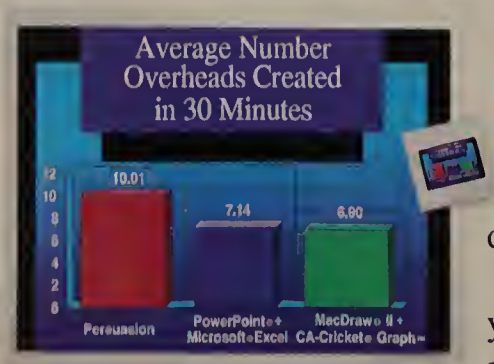

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Getting Started with System 7

A HANDS-ON LOOK AT SOME OF SYSTEM 7'S MOST POWERFUL NEW FEATURES

BY JIM HEID

If you've read "Confessions of a System 7 User" in this issue, you have a good idea of why everyone is talking about the latest update to the Mac's fundamental system software. Never before has the Mac's system software offered so much to such a wide range of users. Novices will appreciate System 7's balloon help and the way System 7 simplifies many of the technicalities that have made the Mac more complex in recent years. Mac veterans will adore System 7's vastly improved Finder, its built-in file-sharing, and its interapplication communication (IAC)—its ability to allow programs to exchange data automatically.

So where do you start? First, get the upgrade package (and its first-rate manuals) from your Apple dealer. Use the Before You Install disk for an intro to System 7's key enhancements. Then scan the hard drive with the BYI disk's compatibility checker—an electronic reconnaissance squad that searches the hard drive for anything that might have problems coexisting with System 7. I discovered remarkably few incompatibilities when working with prerelease versions of System 7, and chances are your experiences will be as favorable. But use the BYI disk to be sure.

If the compatibility checker' reports no serious problems, install the System 7 software. Then sit down at the Mac and continue reading for a hands-on look at some of System 7's hottest new features.

Doing More at Once

In my January 1991 column ("Getting Started with Mac Operating Techniques"), I briefly covered the benefits of *MultiFinder*, which lets you run two or more programs at the same time and switch between them with a mouse click. MultiFinder also lets time-consuming operations such as printing take place *in the background* while you work, and it makes managing disks and files easier, since you don't have to quit a program to get to the desktop. However, many Macintosh users have avoided MultiFinder's *multitasking* benefits, primarily because 1MB Macs lack sufficient free memory to run more than one program at once. Even a 2MB Mac is taxed by complex programs like PageMaker 4.0.

With System 7, multitasking isn't just a good idea—it's the law. You no longer have the option of using the one-program-at-a-time Finder. That's one reason why System 7 requires a minimum of 2MB of RAM. If you find yourself cramped with 2MB now, you'll quickly want more after upgrading to System 7.

You can get a feel for the benefits of multitasking by starting a couple of programs and switching between them using the *application menu* (at the right edge of the menu bar) or

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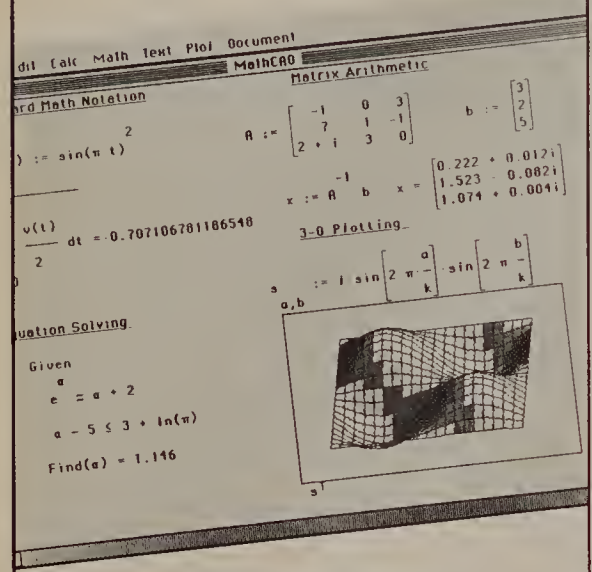

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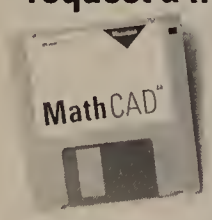

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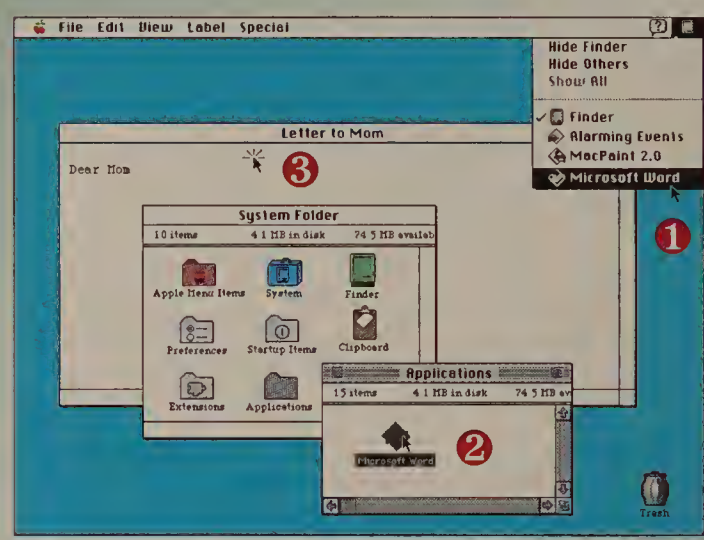
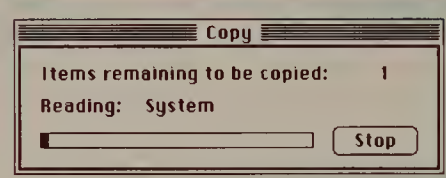
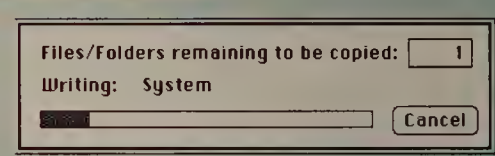
SWITCHING STRATEGIES

System 7 provides several ways to switch between programs that are already running: by using the application menu (1); by double-clicking on the grayed icon of an open application (2); and by clicking within the window of an inactive application (3). To indicate that it's OK to switch to a different program while a file operation takes place, the Finder displays this new type of dialog box containing a title bar (bottom left), which replaces the old-style box (bottom right).







one of the other switching techniques System 7 provides. Or try out the new and improved Finder's ability to copy and search for files in the background (see "Switching Strategies").

You Can Run—And You Can Hide

One problem with the old System 6 MultiFinder was that after you'd opened a couple of programs, your screen became cluttered with windows. Returning to the Finder or switching to a specific program was often cumbersome. System 7's application menu provides two Hide commands and a couple of options that allow for tidier desktops and more efficient switching.

The Hide Others command hides all open windows except those of the *active* application—the one whose menus are in the menu bar. You use this command if an inactive program's windows are obscuring something on the desktop, such as the Trash icon, or simply to reduce distracting clutter.

The Hide command always includes the name of whatever program is active—because it hides only the windows of that program. (If the Finder is active, for example, the command reads Hide Finder.) You might, for example, want to temporarily hide a spreadsheet's window so you can access another file on the desktop, or to hide a game's window when the boss shows up.

Another alternative is to switch to another program and hide the current program's windows in one fell swoop. Just press the option key while choosing the second program's name from the application menu or while clicking in a window of the second program. This option-switch trick is handy for jumping back to the Finder: press option while clicking on the desktop, and the active program is hidden while the Finder is activated.

Incidentally, hiding an application is *not* the same as quitting it. Not only is a hidden program still open, if it's performing a background operation (such as transferring a file over a modem) when you hide it, the operation continues uninterrupted as well. And if you check out the application menu, you'll see that the program is still listed, but its icon (not its name) is grayed, indicating its hidden status. Choose the program's name, and its windows appear in a flash.

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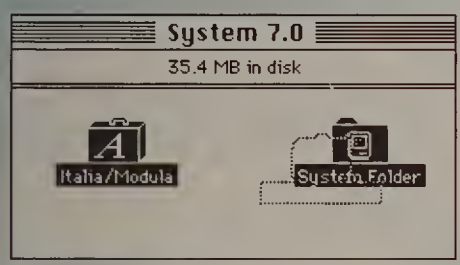
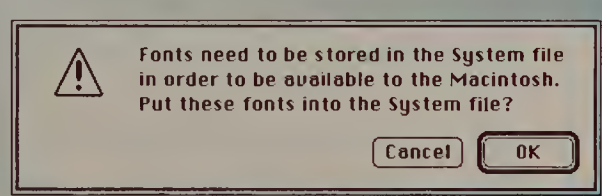
To install a font, drag its icon to the icon of the System Folder. The Finder recognizes that you're moving a font and asks if you'd like to stash it in the System



file (bottom). Click on OK, and the Finder installs it for you. If you've already opened the System Folder, you can install the font by dragging it directly to the System file's icon. If you've already opened the System file, you can drag the font to the System file's window.

To remove a font, open the System file by double-clicking on it. A window appears listing the contents of the System file. Locate the font you want to remove, and drag its icon out of the System file's window. To delete the font permanently, drag its icon to the Trash. For storing fonts you want to keep for future use, consider creating a folder with a name such as Inactive Fonts.



Nor does hiding a program save any memory. If memory is tight but you want to start another program, you need to quit one or more of the programs you've already opened. Remember that you can display a memory-usage graph by choosing About This Macintosh from the Apple menu when the Finder is active. You can use this graph to gauge how your Mac's memory is being used and to determine how much free memory remains. You can also fine-tune your program's memory requirements by using the Get Info command. For more information, see the System 7 manuals as well as "More for Your Memory" and "Getting Started with Memory," *Macworld,* April 1990.

Truth in Type

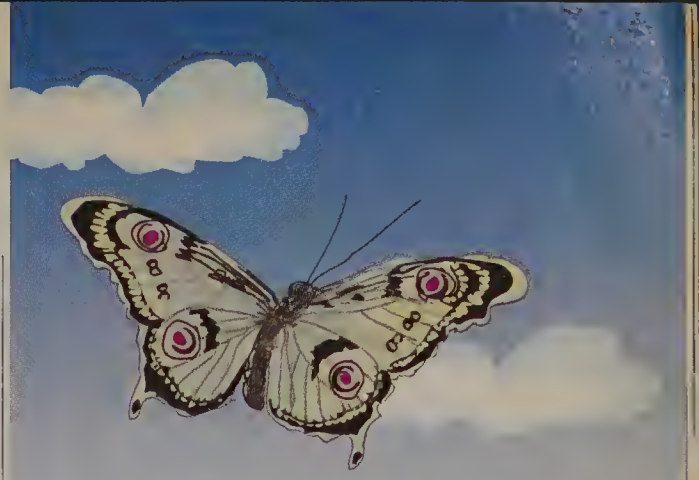
System 7's TrueType outline fonts let the Mac display and print sharp text regardless of size. With the *fixed-size,* or bitmapped, fonts used by previous System versions, that wasn't the case; the Mac needed a separate, space-consuming font description for every size you used. If you chose a size for which no description existed, the Mac scaled an existing size, which resulted in lumpy, jagged-edge text.

To see for yourself, start up a word processor and choose Helvetica from its Font menu. (You will notice that in the program's Font or Size menu, every size appears in outline style—System 7's way of letting you know that they are outline fonts.) Type a sentence, and then select the text you typed. Next, choose some different sizes of Helvetica—try some tiny ones such as 6-point and some huge ones such as 127-point. (In Microsoft Word, choose Character from the Format menu to specify these oddball sizes; in Claris's MacWrite II and T/Maker's WriteNow, choose Other from the Size menu.) As you zip from size to size, the benefits of TrueType fonts will become clear.

If you have some old, fixed-size fonts you're fond of, you can still use them with System 7, but you get good results only when you use sizes that have bitmapped descriptions. If you choose a size for which no bitmap exists, it's back to the scaling world and its ugly side effects.

If you use Adobe Type Manager (ATM), you'll be glad to know it works well under System 7. Indeed, TrueType and ATM complement each other nicely—TrueType creates sharp text at any size for fonts in its own format, and ATM does the same for downloadable PostScript printer fonts

(continues)



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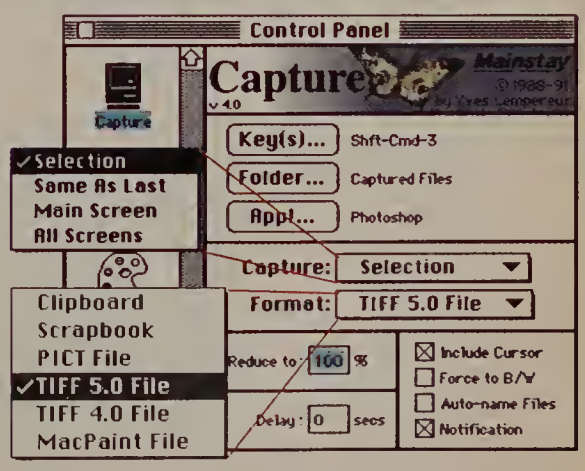

TRADE UP DETAILS: Take a screen shot of your System folder, using any Mac screen capture utility — *Camera™, Desk Camera™, Exposure Pro™, Fkey™, Flash It™, Image Grabber™, MenuPicture™, Screen Dump™, ScreenShot™, Screen Snap™, SnapJot™, SnapShot™ etc.* Print & send it with your credit card number & expiration date or a check for $49.95 plus tax (CA residents) and $5.00 shipping charges. Save over 60% off the suggested retail price! Act now!

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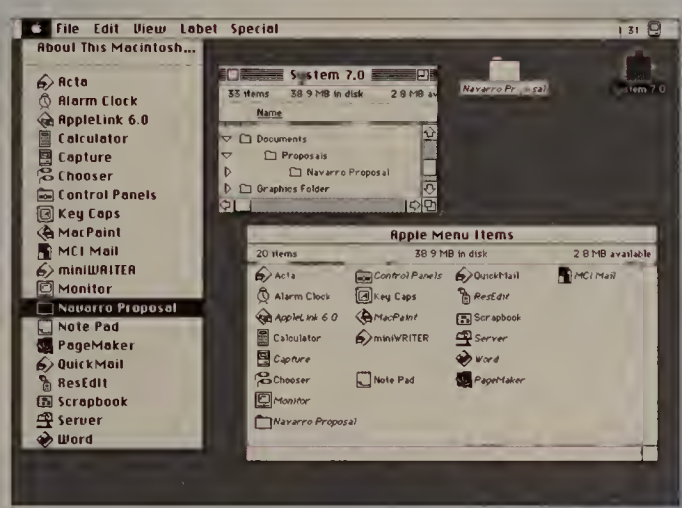
L A S E R M A S T E R

MAKING AN ALIAS

Aliases are small files that give you quick access to the items they're associated with: files, folders, applications, or even disks.

To create an alias, select the icon of the original item, then choose Make Alias from the Finder's File menu. The alias (which looks just like the original except that its name is in *italics*) appears alongside the original, but you can move it wherever you like.

Here, aliases have been created for the folder named Navarro Proposal, which is nested within the Proposals and Documents folders. One alias has been moved to the Apple Menu Items folder (within the System Folder), which puts it on the Apple menu, while a second alias sits on the desktop. The original folder can now be accessed without opening any disk or folder windows, either by choosing the alias from the Apple menu or by double-clicking on the alias on the desktop.



(those font files you stash in your System Folder and that are downloaded to a PostScript printer's memory during a print job). You can also use font-management utilities such as Fifth Generation's Suitcase II with System 7, although System 7's streamlined approach to installing and removing fonts makes such activities less valuable unless you frequently switch between sets of fonts.

A Better Finder

System 7's greatly improved Finder makes installing and removing fonts very similar to dragging files into or out of a folder (see "Font Moving Simplified"), but you'll notice these operations take quite a bit longer than dragging files. That's because the same technical gymnastics that were performed by the Font/DA Mover utility under previous systems now take place behind the scenes. In System 7, the Finder is the gymnast. (So forget Font/DA Mover—if you try to run it under System 7, a message appears telling you that it isn't needed.) Just remember to quit any programs or desk accessories before trying to install or remove a font; System 7 can't install or remove fonts when any programs are running because Mac programs can't update their Font menus on the fly.

And the Finder finally lives up to its name, providing a Find command that lets you locate an item by specifying part of its name or using other criteria. The Finder streamlines the Mac's operation in other ways.

- You can select an icon by typing the first few characters of its name. Combine this technique with the ⌘-O keyboard shortcut for the Open command, and you can open a document or application without touching the mouse. Other keyboard shortcuts let you open and close folders and expand or collapse the outline view of a disk or folder; for a list of these and other shortcuts, choose Finder Shortcuts from System 7's Help menu.
- You can open a document by dragging its icon to an application icon. When you do, the application icon becomes highlighted. Release the mouse button, and the Finder opens the document. This trick is handy for

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importing a text-only file into a word processor. For example, to start Microsoft Word and open a text-only document, drag the text-only document to the Word icon.

- You can install a system-related file —a font, INIT, control panel (a cdev—one of the files whose icons appeared in the old Control Panel DA), printer driver, and so on, simply by dragging it to the System Folder. The Finder then asks if you'd like to put them in the appropriate folders within the System Folder.

A Tidier System Folder

Those folders within the System Folder hold many of the icons that cluttered the System Folder in previous system versions. The Control Panels folder replaces the old Control Panel desk accessory, which has gone to the great Trash icon in the sky. The new approach is far more flexible: you can open any control panel by double-clicking on it, you can move often-used control panels to the Apple Menu Items folder, and you can have more than one control panel open at once.

The Preferences folder is designed to hold the preferences files that many programs create as they run. Most current programs stow their preferences files in the top level of the System Folder, and will need to be updated to take advantage of the Preferences folder.

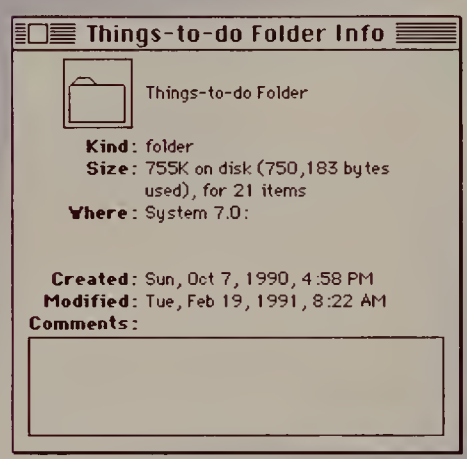
The Extensions folder holds printer drivers and INITs. The former are now officially called *Chooser extensions* by Apple; INITs (sometimes called start-up documents) are now called *system extensions.*

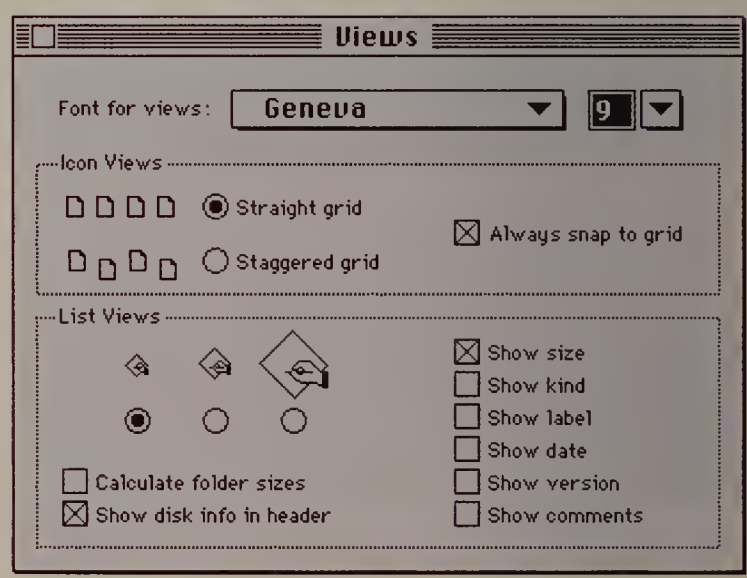
The Startup Items folder holds anything that you want the Mac to open automatically after starting up, such as often-used programs, documents, control panels, or desk accessories. Don't let the Startup Items folder's name confuse you—this folder does not hold INITs.

System 7's subdivided System Folder has important ramifications for INITs. In earlier System versions, all INITs and cdevs with INIT components live in the System Folder and load in alphabetical order. In System 7.0, INITs still load alphabetically, but from a few different places. First, System 7 alphabetically loads the extensions in the Extensions folder, followed by those in the Control Panels folder, and then those in the top level of the System Folder. You need to keep this loading order in mind when troubleshooting INIT conflicts. Also, if you use an INIT-management utility such as INITPicker, you must put it in the Extensions folder so that it loads before other INITs.

CUSTOM ICONS

System 7.0 lets you customize the icons of most items by using the Get Info window. First, select an image in a graphics program and choose Copy. Next, select the icon in the Get Info window; if the icon can be modified, it appears within a rectangle (left). Finally, choose Paste, and the Mac scales the graphic to fit and turns it into an icon (right). The icon for this folder is from HyperCard 2.0's Icon Ideas stack.





IMPROVING YOUR VIEW The Views control panel lets you decide how the contents of disks and folders are displayed. For automatic icon cleanup, select Always Snap to Grid. You can choose any of three different list-view sizes, as well as which information you want shown. Tip: To create small list-view windows when you click a window's zoom box, uncheck most or all of the Show options.

Aliases and the Apple Menu

One of System 7.0's most useful features is the *alias,* a small file that acts like an electronic remote control for a file, folder, program, or disk. Aliases have 1001 uses, but the most common is to give you convenient access to a file or program that you've buried within other folders (see "Making an Alias"). For example, you merely double-click on an alias you've created for your word processor to open the actual application, without opening its folder. And you can have multiple aliases—in various locations—for the same item.

A newly created alias icon looks exactly like the icon of the file or program it points to. The only difference is that it has the word *alias* in its name, but you can change the name to anything you like; you'll still know the item is an alias because its name appears in italics. If you need to quickly locate the item that an alias points to, select the alias, choose Get Info from the Finder's File menu, and

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click on the Find Original button. And aliases are smart—you can move and even rename the item that an alias points to, and the Mac will still find the item when you open its alias.

Aliases team up well with the new and improved Apple menu, which gives you quick access to anything you can open, including programs, documents, folders, control panels, and aliases. To add an item to the Apple menu, simply put it (or its alias) in the Apple Menu Items folder, which is located within the System Folder.

More Customizing Options

In last month's column, I discussed numerous Finder-customizing projects, most of which required resource-editing utilities such as Apple's ResEdit and Michael C. O'Connor's Layout. In System 7, you can perform many of the same customizing tasks—as well as some new ones—without any additional utilities.

The Views control panel lets you tweak the way the Finder displays disk and folder contents (see "Improving Your View"). The Always Snap to Grid option is handy. It puts the Finder in what I call Felix Unger mode—it always cleans up after you, snapping icons that you drag to an invisible grid, keeping them neatly aligned.

Another customizing task involves disabling the warning message that appears when you choose Empty Trash. It's easy: Select the Trash icon and choose Get Info. When the info window appears, uncheck the Warn Before Emptying box. Keep in mind that this removes an important safety net, so don't choose Empty Trash unless you really mean it.

Speaking of Get Info, its window is the gateway to two more customizing options. You can use the Get Info window to change the icon of a file, folder, or disk (see "Custom Icons"). You can even paste a scanned image into an icon—a handy way to preview a scanned image without starting up a graphics program.

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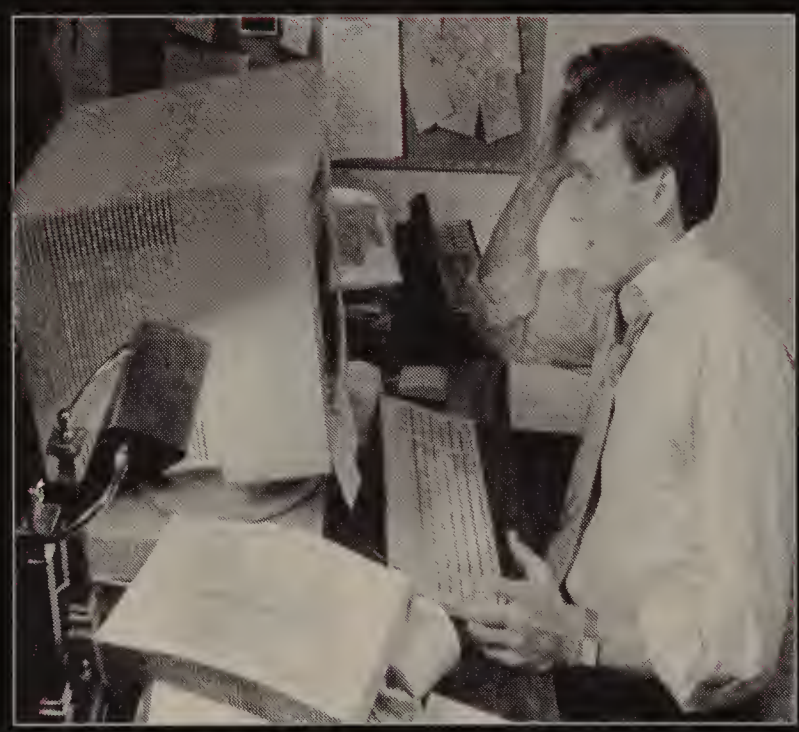
So You're Feeling Squeezed



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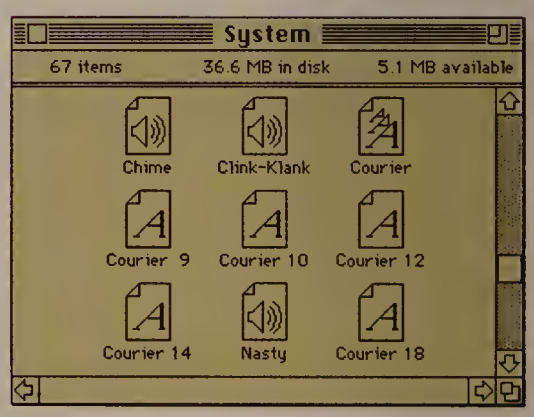
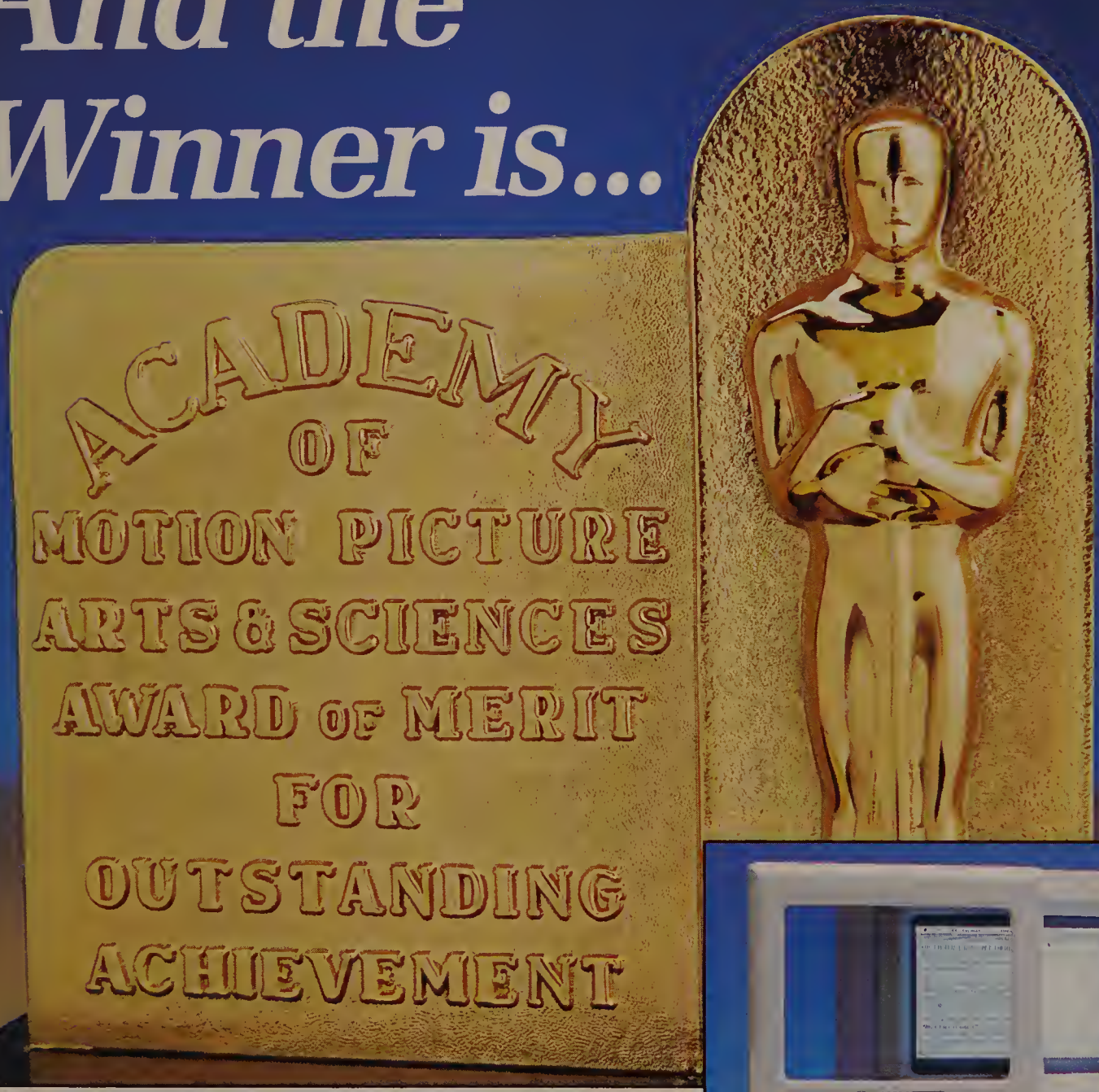
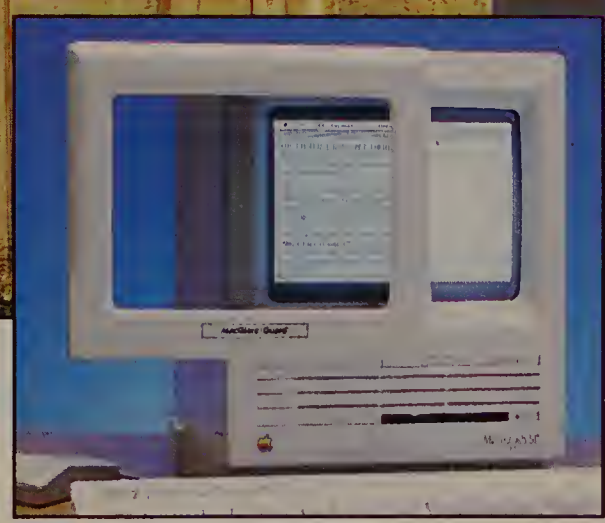


WINDOW ON THE SYSTEM FILE When you double-click on the System file, a window appears listing its fonts and sounds. You can play a sound or see a font sample by double-clicking on an icon. Note that a TrueType font's icon has several type sizes in it. A fixed-size (bitmapped) font icon shows just one size, and the icon's name indicates the size. Notice that no desk accessories appear in the System file window. System 7 still lets you use DAs, but you no longer have to install them with Font/DA Mover. Instead, they reside in separate files, and you open them by double-clicking on their icons. In short, DAs work more like stand-alone programs.

And the Winner is...





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A document's Get Info window contains a Stationery Pad check box that lets you turn a document into a *stationery pad,* a template you can use as a starting point for new documents. Candidates for stationery pads include a custom letterhead, a newsletter template, or a fax cover sheet. When you open a stationery pad, the Finder makes a copy of the pad, leaving the original unchanged. Thus you can reuse the same document without worrying about accidentally replacing its contents.

As you work with System 7.0, you'll discover that many of its features become even more powerful when you combine them. For example, say your office has one Macintosh whose hard drive has been made available to everyone via System 7's file-sharing features. You can create a stationery pad for a document on that shared hard drive, then make an alias of it, and then stash the alias in the Apple Menu Items folder on your own hard drive. From then on, whenever you choose the alias's name from the Apple menu, the Macintosh will connect to the shared hard drive if necessary, make a copy of the stationery pad, and then open the copy—a multistep process reduced to one mouse-click.

There's far more to System 7 than I have room to describe here. In upcoming columns I'll take a closer look at some of System 7's subtleties, especially IAC. With IAC and *AppleEvents,* programs (or more accurately, versions of them updated for System 7) will be able to work together in remarkable ways. IAC lets you move information from one program to another *and* have the information updated automatically when you change the original. AppleEvents allows separate programs to work together intimately, exchanging data and even controlling each other.

In the meantime, the best way to master System 7's new features is by experimenting. Explore the Finder's new menu commands. Turn on the balloon help feature and point to everything you see, including files and folders within the System Folder. The Finder provides over 1300 help balloons that succinctly explain its menu commands, the System Folder's components, and the Mac's user-interface elements. If you're just getting started with the Mac, you'll develop a better understanding of how it works. And if you've used earlier versions of system software, you'll feel like you've discovered the Mac all over again. ■

Contributing editor Jim Heid focuses on a different aspect of Mac fundamentals each month. For more on System 7.0, see his latest book, Macworld Complete Mac Handbook *(IDG Books Worldwide), an updated, expanded collection of more than 40* Getting Started *columns.*

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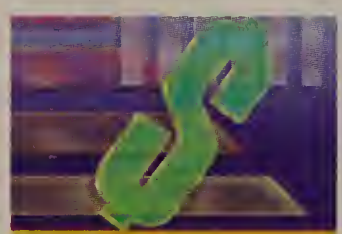

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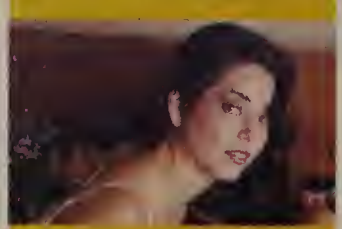

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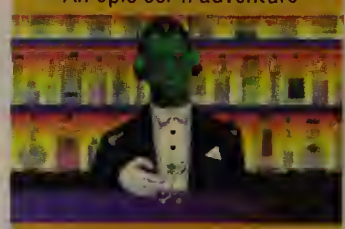

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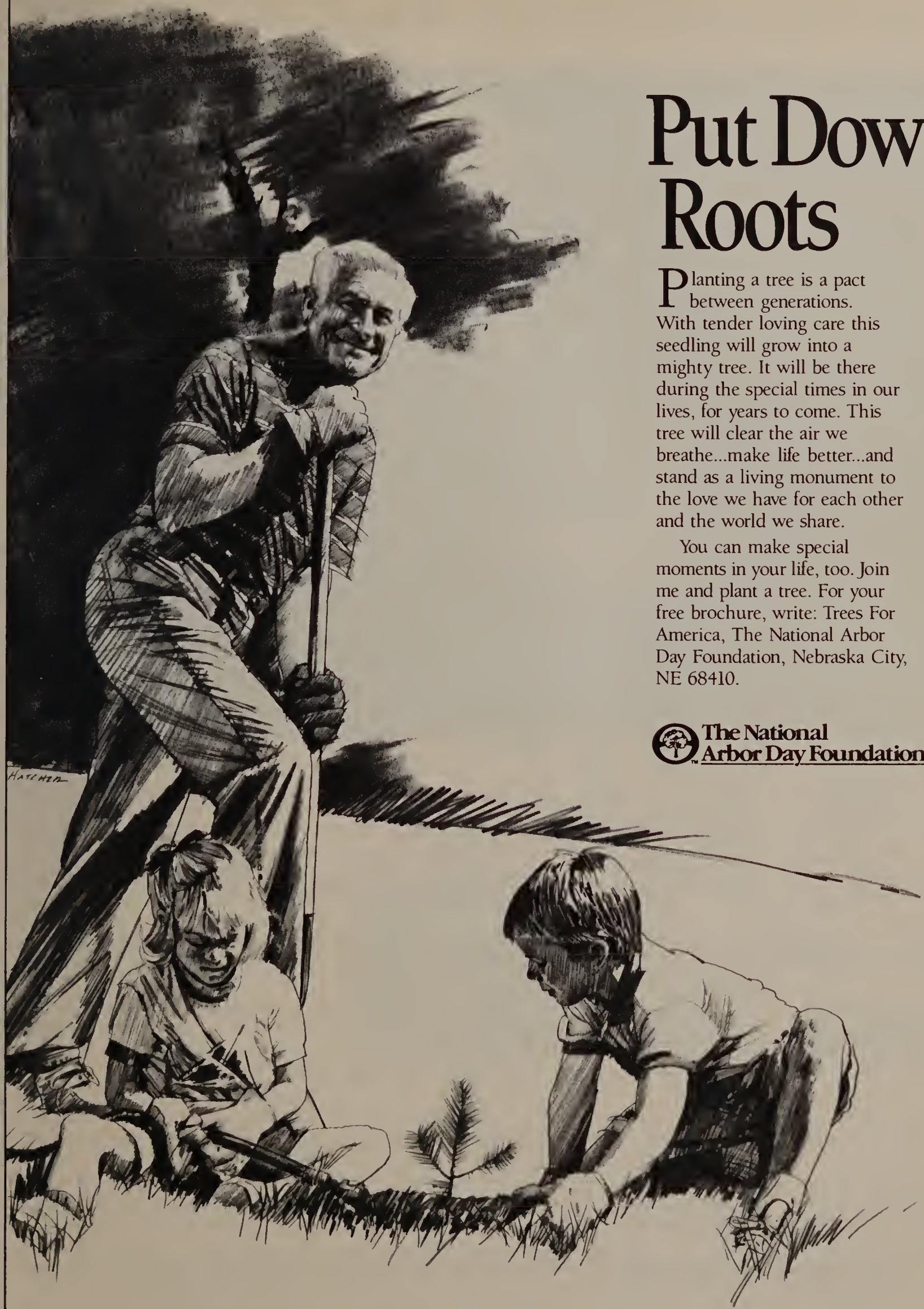

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Insights on WordPerfect 2.01

Hints for making WordPerfect documents a little closer to perfect

BY CHARLES SEITER

Longtime Mac enthusiasts who have been typing away for years in MacWrite, Microsoft Word, or WriteNow will probably be surprised to hear that most of the time WordPerfect is the second-best-selling Mac word processor on the market. The first version, released after formidable delays (at one point, in fact, WordPerfect Corporation was marketing the beta version to the public), had an impressive array of power features but a quirky, PC-influenced, and decidedly un-Mac-like interface. Version 2.01 is coded from scratch and offers still more power while managing to bring its interface into closer conformity with the expectations of users trained on the Mac. To appreciate the power of WordPerfect 2.01, it is worth getting past the beginner's level. Here are some hints for doing just that. Special thanks to Marsha Terry and Kathryn Pond-Sargeant of WordPerfect Corporation for their advice and for reviewing these tips.

SCOTT BALDWIN

Style Is Everything

One of the main differences between 2.0 and earlier versions of WordPerfect is 2.0's Styles feature. It is a welcome addition, since everyone simply expects styles in a high-end word processor. The first thing you might want to know about style is how to change the parameters of Normal, the default style that ships with the program. Go to the Layout menu, pick Styles, and select Edit from the pop-up menu that appears. Scroll down the list of styles to Normal, select it, and click on the Edit Contents button. Now you can define the style you want using the standard menus; just pick font, font size, columns, or other formatting information from the menus, and watch the program record the information in the styles-editing screen that opens at the bottom of the current document (see "Taking Note of Styles"). Note that, even if it may seem more convenient to pick style information from the Ruler—as you can in Word—the style option is available only from the menus.

The best method for developing new styles that have at least a few elements in common with an existing style is to use the Based On and Link To options, which appear when you select New from the Styles pop-up menu. Based On makes the current style a base; you simply call up the appropriate items from the Layout, Font, and Style menus to make any changes (see "Based on Basics").

Link To makes it easy to format complex layouts with several styles. If, for example, you are creating a newsletter that has a heading with a distinctive font and margins, you can save time by linking two styles. First, create the text style with the font and

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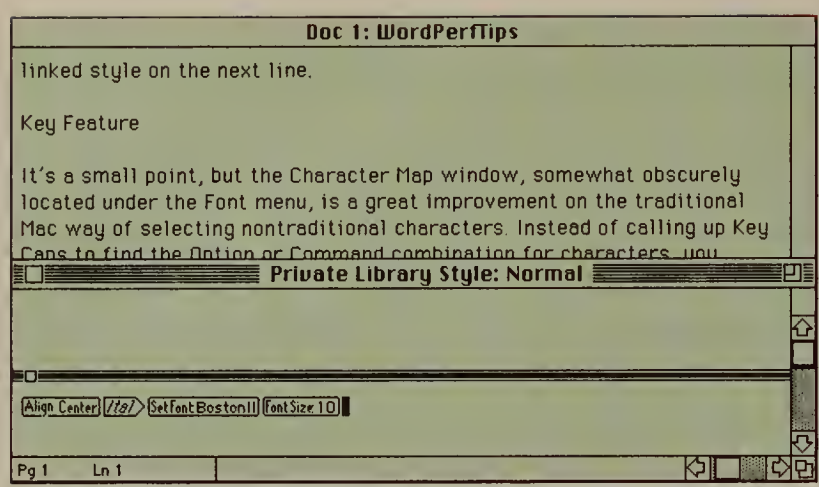

TAKING NOTE OF STYLES To change the default style for documents, call up Normal from the list of styles and choose Edit Contents. Your changes are recorded in the style-editing window at the bottom of the screen.

margins (or columns) you need and save it with an appropriate name, like NLText. Next create a Heading style separately. Finally, select Link To and choose NLText from the choices in the scrolling list. When you create a document, you select the Heading style from the Style menu and type in the headline. Then press enter on the numeric keypad and the program switches you to the next linked style, in this case NLText. The enter key signals WordPerfect to start the linked style on the next line.

Merging with Macros

Macro programming can seem a daunting proposition for users whose main interest is basic word processing. WordPerfect makes macro programming fairly simple by offering a Record facility that can access all the capabilities of the Search menu and the Tools menu (including Graphics)—often you can produce a useful macro with just a few keystrokes.

Even simpler than the Record feature is the use of the macros already provided in the current shipping version (2.01). Two of these macros are particularly useful. The first is Tables. When you select Tables, WordPerfect prompts you to provide the number of rows and columns you wish, and the macro sets up a boxed table for insertion of data. The other macro that you're likely to use extensively is the standard Labels Layout, for printing mailing labels.

Macro Power

A little work with the macro manual can often save lots of time. Suppose, for example, that you have a mailing-list file in another program and you try to use it with a form letter generated in WordPerfect. Immediately you realize that the rest of the software world is set up to use tab-delimited databases or lists (fields are separated by tabs; records are separated by returns). By creating a basic macro, you can bring a tabbed text file into WordPerfect, but the program can't read the file unless fields are marked with WordPerfect's own end-of-field symbol and the records end with its end-of-record symbol.

If you have a list of 500 names and addresses, you are not going to want to replace all those tabs and returns by hand. But macros can make the replacements semiautomatically. One simple way to create such a macro is to turn on the Record function from the macro menu after you open the imported tabbed text document—be sure your cursor is at the beginning of the document.

In the dialog box that appears, enter a name for the macro; choose either the Private Library or the current document in the Save In pop-up menu; and click on New to dismiss the dialog box. Now choose Find Code from the Search menu, scroll down to tab in the list that appears (or press T to get there fast). Next click on Find (you'll see that the cursor jumps to the first tab in the open document), then click on Remove, and close the Find Code window. Now choose Merge from the Tools menu and double-click on End of Field in the scrolling list that appears. Finally, choose Stop Recording from the Macro menu and click on Yes when the program asks if you want to save your changes.

What you have at this point is a little one-at-a-time replacement macro. If you have 500 records, you probably want something a little more automated. By selecting Edit from the Macro menu you can call up your macro as a text file (see "Making Macros"). You can add a loop that repeats the one-time replacement as many times as you want. Suppose each record contains five fields. Then the whole file has 2500 tabs to be replaced. If you add the following lines in the macro-editing window, the macro will execute 2500 times.

```
Assign(Var01;0)
Repeat
   (core replacement macro you just
recorded)
   Assign(Var01;Var01+1)
Until(Var01=2500)
```

This macro merrily makes all the replacements you need. Now go through and record a macro for changing all the hard-returns to End of Records (using the same Find Code and Merge list you used in the first case), and make that macro repeat 500 times instead of 2500. After you

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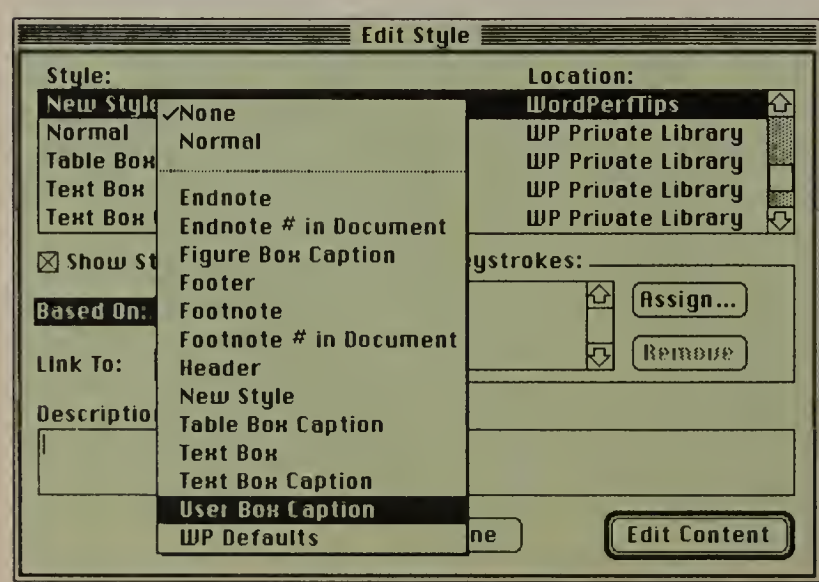

BASED ON BASICS The Based On option in WordPerfect styles lets you tinker with an already developed style. You will be able to see your changes explicitly recorded in the style-editing window—this makes it easy to track small differences between styles.

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MAKING MACROS This little sample shows, at least, that the macro language is easy to understand, even if the diminutive (and nonmodifiable) type in the macro-editing window calls for acute vision.

run both macros, the file is properly formatted for merging with a WordPerfect document.

This, by the way, is the least sophisticated way to get the job done; an experienced macro programmer would write a loop that searches for and replaces each kind of delimiter automatically until the loop reaches the end of the file, so the user doesn't have to keep track of file length. But the above procedure works, it's easy to debug, and it lets you get a glimpse of macro power.

Switched-On Macros

If you name a macro OnStartUp and use WordPerfect's Librarian feature to copy it into your USA Private Library (the new 2.01 name for WP Private Library), that macro runs every time WordPerfect is started. Often this approach is convenient if you are working on a project that calls for unusual document formats or graphic constructions embedded in documents. You can also put start-up macros into the Common Library for network users.

Similarly, if you name a macro OnOpenDocument and save it in your document, the macro executes automatically when you open that document in WordPerfect. This trick doesn't work if you open the document simply by double-clicking on the Desktop icon, but this apparent limitation in function means that you can easily choose whether to run the macro or not.

Page Layout for the Amateur

The Text Box feature of WordPerfect can be used to seam together professional-looking one- or two-page flyers in a hurry. Basically, when you open a text box you get a miniwindow for word processing (the text box can handle WordPerfect's full range of fonts, styles, and columns), which can be dressed up with attractive frames and borders. A text box can also be positioned (using box handles), numbered, and captioned. So, if you have a number of short text items to arrange on a page, one maneuver is to put all items smaller than a page-

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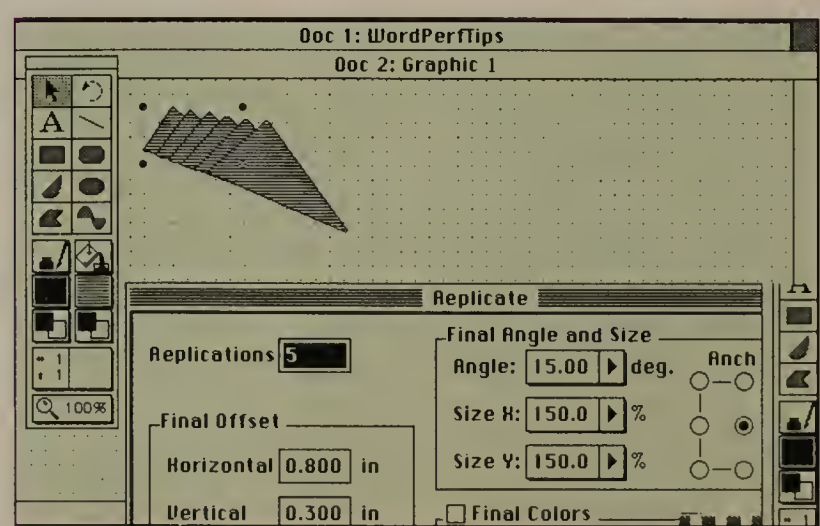

POWER DRAWING The Replicate command in the Arrange menu of the Graphics window in WordPerfect is a veritable artwork factory—you can replicate any graphic selection while scaling, rotating, translating, and even color-blending the set of copies.

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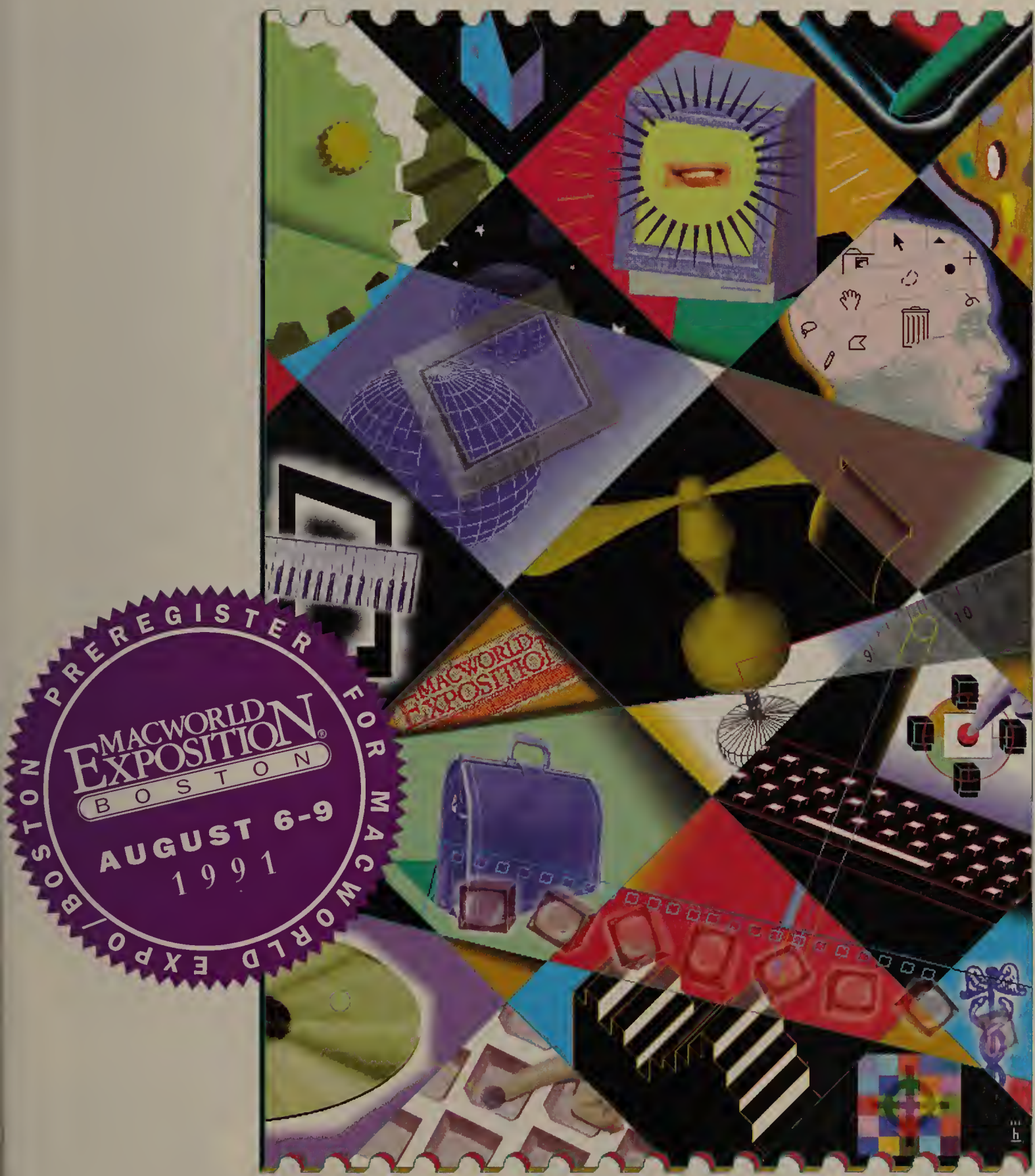
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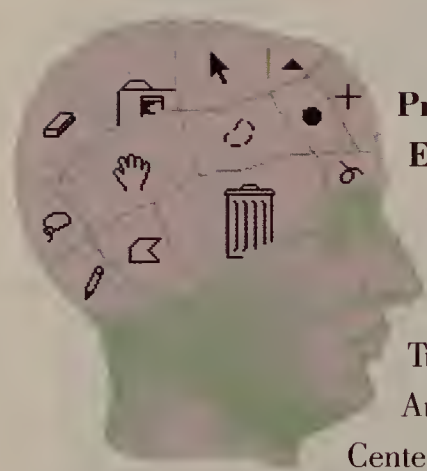

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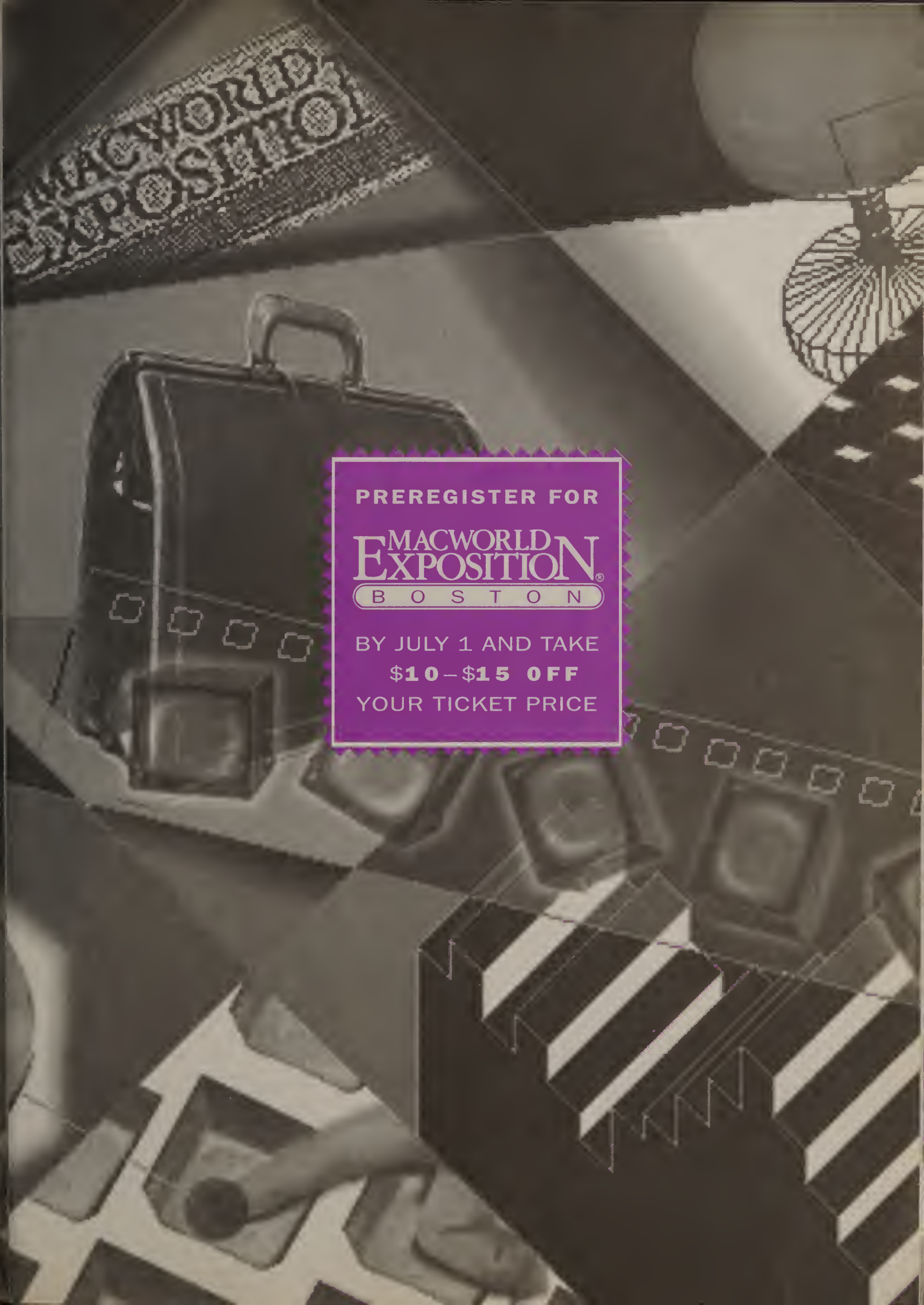
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16. ☐ CEO/president/owner
17. ☐ DP/MIS manager
18. ☐ Manager/department head
19. ☐ Network manager
20. ☐ Programmer/analyst
21. ☐ Engineer/research & development
22. ☐ Consultant
23. ☐ Marketing/sales
24. ☐ Educator
25. ☐ Art director/graphics
26. ☐ Editor/writer
27. ☐ Other (specify)_____

Size of Your Organization (number of employees national and international)

28. ☐ Under 50
29. ☐ 50–99
30. ☐ 100–499
31. ☐ 500–999
32. ☐ 1,000–5,000
33. ☐ Over 5,000

Which personal computer(s) do you own/use?

34. ☐ Macintosh Classic
35. ☐ Macintosh Plus
36. ☐ Macintosh SE
37. ☐ Macintosh II
38. ☐ Macintosh
39. ☐ Macintosh LC
40. ☐ Macintosh IIsi
41. ☐ Macintosh IIci
42. ☐ Macintosh IIfx
43. ☐ Apple II Series
44. ☐ IBM PC (or clone)
45. ☐ None
46. ☐ Other (specify) _____

*MACWORLD Expo conference sessions are on a first-come, first-served basis with no guaranteed seating and are subject to change without notice. All registration fees are nonrefundable. Do not staple check to form. Send completed form, with check or money order to: MACWORLD Expo, P.O. Box 4010, Dedham, MA 02026.

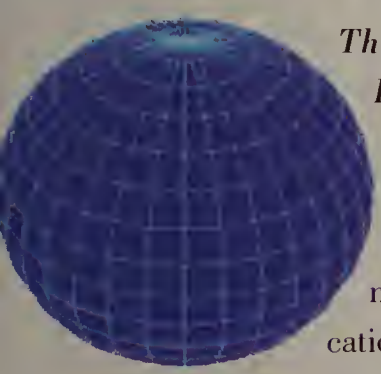
MW791

The Designer Mac. The latest trends and tips for graphic artists, ad agencies, architects and engineers.

The Macintosh in Multimedia. The dazzling developments surrounding the exciting integration of video, sound, animation, and graphics.

Mac Programmer/Developer Forum. The place for novice and veteran techies to meet, learn and brainstorm.

Future Technologies on the Mac. Cutting edge innovations destined to make the Mac even more powerful and versatile.



The Mac in Entertainment. Demonstrations, trends and how-to's for this fascinating new application area.

The Business/Professional Macintosh. Solid advice and case studies for corporate, small business, legal and health care users.

The Mac in Education. How teachers and administrators — from kindergarten through college — can use the Mac to great advantage.

Maximizing your Macintosh. Share experiences, get new ideas and insider's tricks at these advanced insider workshops.

Getting Started with Mac LC. A brand-new conference for those who are brand-new to the Mac.

You-Asked-For-It. Special requests, newest market developments and the perennial favorite, Mac User Group Extravaganza (MUSE).

UGWUMP (User Group Welcoming/Unwinding/Meeting Place). "People networking parlor" for user groups. Share success stories, exchange newsletters and literature. Learn how to start a user group in your area, and more!

Save 5% to 45% when you fly American Airlines.

MACWORLD makes it possible to save money getting to and around Boston. American Airlines will automatically discount your fare from 5% to 45% when you call 1-800-433-1790 and ask for Star File #S0580AL.

Reduced rates for hotels and cars.

What's more, you'll get a reduced rate when you book your reservation directly at one of the hotels listed here. Just mention you're coming to MACWORLD Expo. But hurry, these rooms fill up fast.

And if you plan to rent a car, you'll receive a great rate from Avis when you tell the reservations operator that you're a MACWORLD Expo attendee. Just call 1-800-331-1600 and ask for Worldwide Discount #B136000.

Don't miss out on incredible preregistration savings.

The deadline to receive your preregistration discounts of either $10 or $15 is fast approaching. So fill out the attached form today and send it in with your payment (check or credit card). And if the form is missing from this ad, or if you have any other questions, just call the prerecorded MACWORLD Expo information hotline at **617-361-3941.**

MACWORLD Expo. For all that's new in the world of Macintosh, it's just the ticket.

Hotels

57 Park Plaza
482-1800; $100/$110

Back Bay Hilton
236-1100; $150/$170

Boston Marriott Copley
236-5800; $165/$185

Charles Hotel
864-1200; $168/$178

Colonnade
424-7000; $150/$170

Copley Plaza
267-5300; $175/$195

Four Seasons
338-4400; $205/$225

Guest Quarter Suites
783-0090; $145/$165

Hilton at Dedham Place
329-7900; $125/$135

Holiday Inn/Boston
277-1200; $110/$120

Holiday Inn/ Government Center
742-7630; $131/$147

Holiday Inn/Randolph
961-1000; $87/$95

Howard Johnson/South
288-3030; $75/$85

Hyatt Regency
492-1234; $165/$185

Inn at Children's
731-4700; $99/$109

Lafayette Hotel
451-2600; $160/$180

Lenox Hotel
536-5300; $145/$165

Logan Airport Hilton
569-9300; $135/$155

Marriott Long Wharf
227-0800; $215/$235

Meridien
451-1900; $185/$205

Midtown Hotel
262-1000; $99/$109

Omni Parker House
227-8600; $145/$165

Park Plaza
426-2000; $120/$140

Ritz Carlton
536-5700; $185/$205

Royal Sonesta
491-3600; $140/$140

Sheraton Boston
236-2000; $135/$155

Sheraton Tara Braintree
848-0600; $130/$130

Tremont House
426-1400; $110/$125

Westin Copley
262-9600; $170/$190

All phone numbers are 617 area code. Rooms are priced for single and double occupancy.

MACWORLD EXPOSITION

* All conference sessions are on a first-come, first-served basis with no guaranteed seating.

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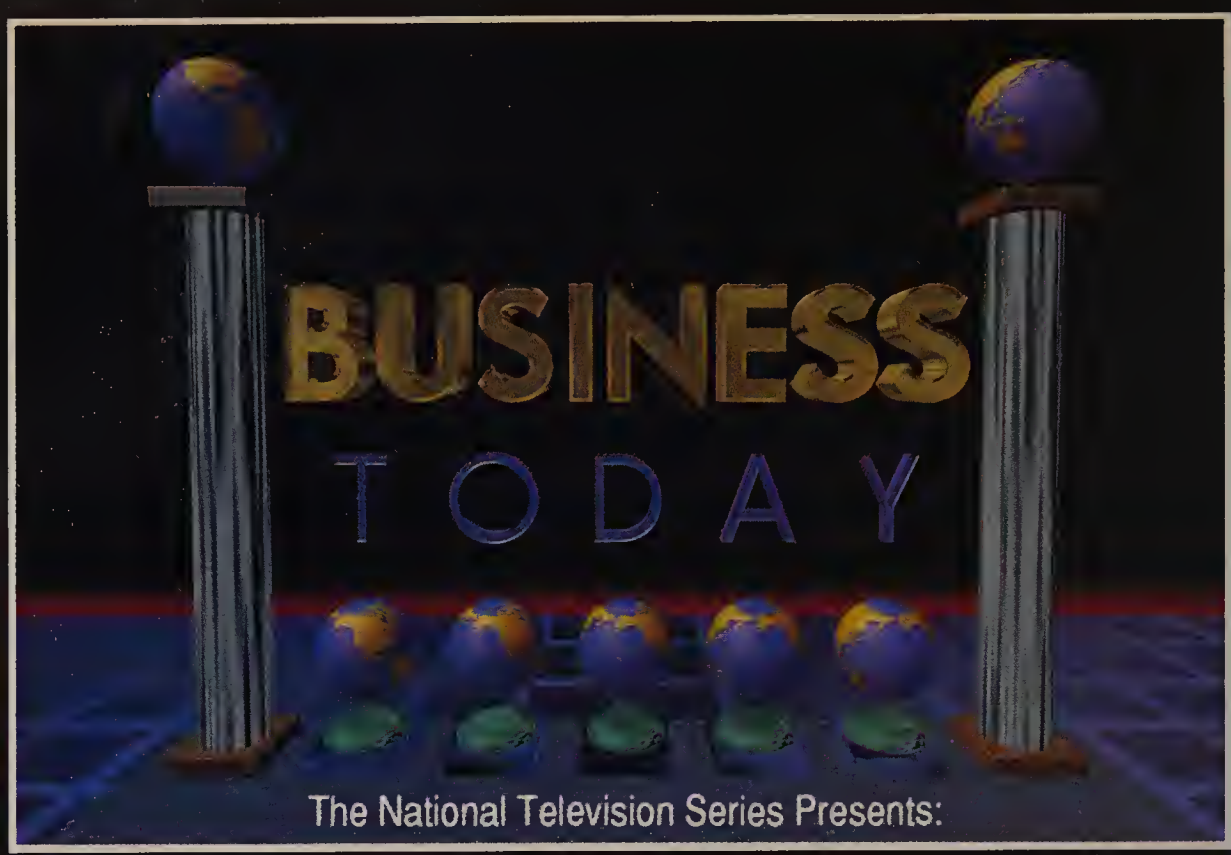


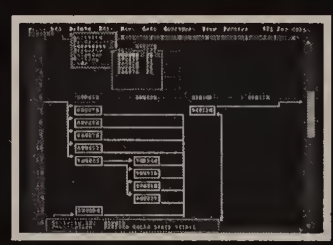
COMPUTER BUSINESS TODAY
AN 8-PART SPECIAL EDITION

In Today's tough competitive corporate climate timely technology decisions can have a profound effect on a corporation's performance capabilities, at every level.

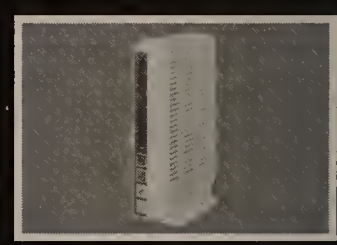
"Computer Business Today" is a fast-paced special edition of Business Today whose format is strictly application-oriented "Hands On" information, with the end user in mind.

An Elite assembly of the industry's state-of-the-art products will be showcased each week beginning May 12. Pictured below is a representative window to a range of technologies featured that harness the impact of computer technology to create and solve task-specific applications from Telecommunications to Networking -- solutions that today's marketplace demands.

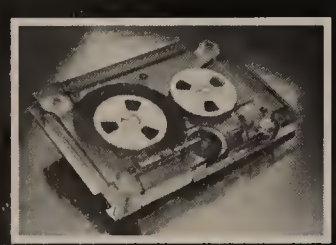
Super Cordless Mouse, Super Mouse II w/Microsoft Windows 3.0, and Z-Scan hand held scanner by Z-Nix Company -- a new line of computer input devices for improved productivity.



Open Plan 4.0, a major upgrade to Welcom Software Technology's project management software package now includes Project Executive, a new graphical interface that lets users input and view data from three prespectives.

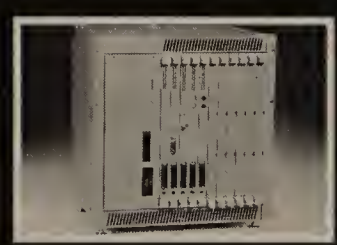


FORVAL AMERICA'S SA14400 super-high speed standalone, dial-up modem for personal computers/workstations -- 14.4Kbps base speed with up to 4:1 data compression and exceptional accuracy.



Magnus 1.35 gigabyte capacity data cartridge by 3M -capable of supporting the high densities of the new QIC-1350 recording format.

The TurboPS Series by NewGen Systems -- a family of advanced PostScript compatible printers, distinguished by higher resolutions (up to 1200 x 600 dpi) and faster processing speeds.

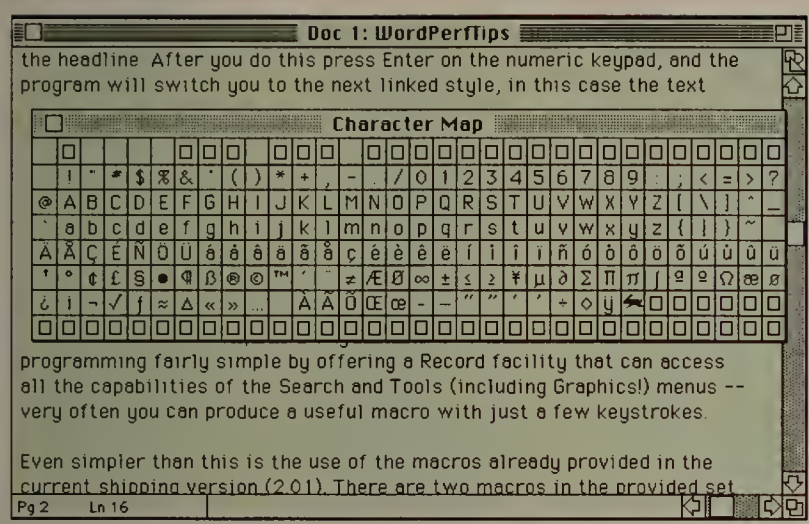


Gandalf Data -- The Access Hub 132 10 BASE-T complaint LAN wiring hub with the Access Manager network management system -- allows creation of Ethernet networks with graphical user interface and fault management capabilities.

Diskette duplication services by Corporate Disk Company -catering to the specialized needs of corporations and software developers.

"Computer Business Today". For People who use computers. Tuesday evenings, Friday and Sunday mornings. Check your local listings for time and channel information.

Produced by WJMK Inc., 2424 N. Federal Hwy., Boca Raton, FL 33431



LOTS OF CHARACTER If you aren't a heavy user of umlauts, you'll find WordPerfect's Character Map (under Font) the fastest way to pick out non-ASCII characters for text. You can leave the map open while you work on a document.

length column of text into text boxes. That way you can drag text boxes, and any graphics boxes you have, around on the page just as if they were independent pieces of paper and you were doing traditional high-school-newspaper pasteup, except that the pieces are floating on a Macintosh screen and are still editable.

This tip comes in handy for publications that have repeating headlines, or information boxes. You can create a headline or text, in a text box, with the style parameters that you want. These boxes can be stored, placed into a page layout, and moved around like objects. For short documents you can juggle text boxes to produce PageMaker-style results without having to worry about picas, or consulting a manual.

Quick Pix-Fix Tricks

The graphics environment in WordPerfect 2.01 is full of large and small amenities. If you double-click on the color tool in the Draw palette, for example, you can edit color selections, producing novel blends or rainbows (you can also edit the pen pattern by double-clicking on it). The same is true for the monochrome tools—essentially you get a FatBits-like edit capability for the fills.

Another slick feature is graphics cropping. To crop an image you simply hold down the option key while you size the graphics box that automatically surrounds images in WordPerfect documents. This trick works for graphics created in WordPerfect as well as for imported art. When you hold down the option key as you move the handle of the graphics box inward, the box becomes smaller, but the graphic remains the same size. If you move the handle outward, the image remains stationary, but the box enlarges to include more of the image. This is not only a fun tool to use, but it can make a dramatic impact on the art you create as well.

Finally, you can make complex repeated graphics easily in WordPerfect 2.01 using the Replicate command, which is under the Arrange menu in the drawing window (see "Power Drawing"). Note that you can specify offset position, size change, and rotation of each repeated figure independently.

Character Map Key

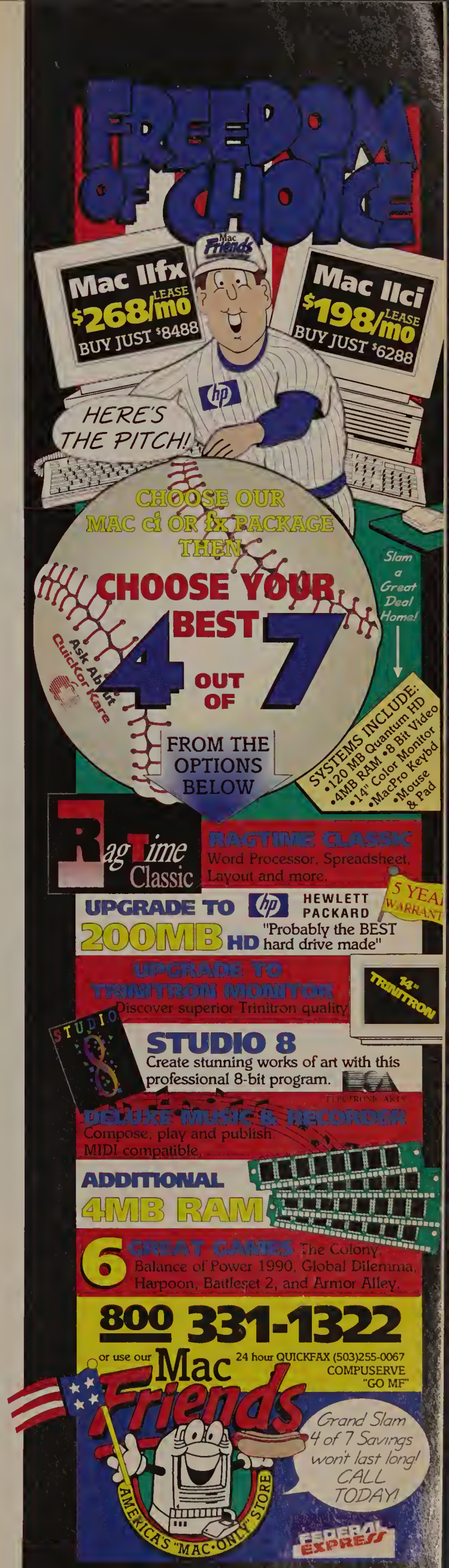
Instead of calling up Key Caps to find the option- or ⌘-*key* combination for characters, you simply pull up the Character Map and click on the character you want (see "Lots of Character"). It's probably not the preferred way to type rapidly in French, but if you just need to find an occasional ™ or ∞ symbol it's wonderful.

Sharing the Wealth

If you've found a tip or shortcut not mentioned here, spread the word to other *Macworld* readers by sending it to *Quick Tips,* and if you've got suggestions for products you'd like to see covered in *Insights,* send them to *Insights, Macworld,* 501 Second St., San Francisco, CA 94107. ■

See *Where to Buy* for contact information.

As a Macworld *contributing editor, Charles Seiter is no stranger to either his keyboard or the world of word processors.*



Circle 58 on reader service card.

CALL FOR ENTRIES

MACWORLD Macintosh Masters IV Art Contest

ROBYN MILLER

HIDEAKI EBATA

CATHY MALKASIAN

WIN PUBLICITY AND PRIZES

Grand-prize and category winners will receive hardware and software prizes. Winning entries will appear in *Macworld*'s annual Macintosh Masters Art Contest feature article.

DEADLINE

Macworld must receive all entries by Monday, July 8, 1991.

JUDGES

- Patrick Coyne (Editor and Designer, *Communication Arts*)
- Hugh Dubberly (Chairman, Computer Graphics Department, Art Center College of Design, and Creative Director, Apple Computer)
- John Lasseter (Animation Director, Pixar)
- Jane Palecek (Art Director, *In Health*)
- Robert Riley (Curator of Media Art, San Francisco Museum of Modern Art)

CATEGORIES

- Animation
- Fine Art
- Graphic Design
- Illustration
- Informational Graphics (charts, maps, diagrams, graphs)
- 3-D Modeling and Rendering
- Technical Illustration (medical drawing, architecture, and mechanical design—no drafting)
- None of the Above

RULES

Maximum four entries per person. Entries will be judged on technical innovation and aesthetic value. Send disk copy and hard copy of each entry (submit animations on disk or VHS-format tape). Entries will be returned only if accompanied by preaddressed packaging with correct postage. *Macworld* is not responsible for loss or damage. Entries must be original and entrant must have all permissions necessary for *Macworld* to use the artwork. Submission provides *Macworld* with a nonexclusive right to use or publish your work in any manner in connection with the art contest. *Macworld* employees and their relatives are not eligible. For more information, call 415/978-3149.

With each entry include this form or a photocopy (FILL OUT COMPLETELY AND SIGN), a detailed technical description of how you produced the work, and $10 per entry. Send entries to: Macintosh Masters IV Art Contest, *Macworld,* 501 Second St., San Francisco, CA 94107, USA. Make checks payable to *Macworld.*

Name _____

Address _____

_____

Phone number(s) _____

Title of work _____

Category _____

Submission format:

☐ Disk ☐ Hard copy ☐ Video (VHS) ☐ CD ROM

☐ Slide ☐ Photo (for mechanical design only)

☐ Other _____

Required to view art:

Hardware _____

Software (include version number) _____

_____

☐ Please return (postpaid preaddressed packaging included)

Signature _____

UPDATES

Here's our list of some of the latest versions of Mac software that were announced at the time we went to press. We hope you'll find it useful. The first price is the upgrade cost for registered owners; the second price is the current list price. (Send your update announcements to Updates, Macworld, *501 Second St., San Francisco, CA 94107.)*

DataPrism version 1.1 allows local sorts on data that has been retrieved from server. Supports Oracle's SQL Connect connection to DB2 servers, and Oracle and Rdb servers through the SequeLink system from TechGnosis. Brio, 415/961-4110. Free; $345 new.

FileMaker Pro version 1.02 prevents corruption of files being converted from FileMaker II to FileMaker Pro, eliminates out-of-memory conditions when printing to the Hewlett-Packard DeskWriter, is compatible with all GCC Technologies printer drivers, and fixes bugs that affected repeating and sliding field features. Claris, 408/987-7000. Free; $299 new.

SAM version 3.0 can be updated with new virus-definition files from the Symantec BBS or the company's 24-hour virus news line. Includes a scaled-down version of the SAM Intercept module for systems with limited memory. Supports System 7.0. Symantec, 408/253-9600. $29; $99 new.

WordPerfect version 2.0 includes a graphics editor with drawing tools. Figures can be sized, scaled, or cropped. Automatically wraps text when figures are placed on a page. WordPerfect Corporation, 801/222-5000. $89; $395 new.

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
4th Dimension	2.1	1MB/6.0.2		Free
Aatrix CheckWriter II ★	2.01	512K/4.1		$10
Aatrix TimeCard	2.0	512K/4.2		Free
Accountant Inc., Professional	1.0.4	1MB/6.0.3	9/90	$19.95
ACCPAC Bedford Simply Accounting	1.1	1MB/5.1		$50
AccuText	2.0	4MB/6.0.2		*
Address Book	2.0	1MB/6.0.2		$25
Adobe Illustrator	3.0	2MB/6.0.3	2/91	*
Adobe Type Manager ★	2.0	1MB/6.0.2		Free
After Dark	2.0	512KE/4.1	5/91	*
AgfaType	2.0	2MB/6.0.2		Free
Alchemy	1.1	1MB/6.0	10/90	$25
Aldus FreeHand	3.0	1MB/6.0.3		*
Aldus PageMaker	4.0	1MB/4.1	9/90	$150
Aldus Persuasion	2.0	1MB/6.0		*
Analog Connection WorkBench	3.0	1MB/5.0		$50
AntiToxin	1.3	1MB/6.0.2		$15
AppleShare File Server	2.0	512K/3.2		*
The Art Importer	2.0	1MB/6.0		$20
ArtRoom	3.0	512K/3.2		$199
Ashlar Vellum	2.0	4MB/6.0.2		$95
Astrix ★	1.01	1MB/6.0		Free
A/UX	2.0	4MB/6.0.5		*
BackFax	1.5	1MB/6.0.3		$7.50
BackMatic	2.0	1MB/4.2		*
Bitstream Typeface Library	2.0	1MB/6.0		*
Blueprint	2.0	1MB/6.0		*
Bomber	2.0	1MB/6.0		*
Business Sense ★	1.2	1MB/6.0		*
Business Session ★	3.2	512K/3.2		Free
CA-Cricket Presents	2.0.1	1MB/6.0		*
CanOpener	1.1	512K/3.0		Free
Canvas	2.1	1MB/6.0		*
Capture	4.0	1MB/6.0		$30
Chem3D	3.0	1MB/6.05		*
Claris CAD	2.0	2MB/6.0		$79
Comment	**2.02**	**1MB/6.0**		*
CompileIt	1.5	1MB/6.0.2		$30
CompuServe Information Manager	**1.03**	**1MB/4.1**		*
CompuServe Navigator	3.0	512K/4.1	12/90	*
ConcertWare	5.1	512KE/4.2		$35
Correct Grammar	2.0	1MB/4.2	9/90	$29.95
Crystal Ball	2.0	512/4.2	7/91	$75
DataMerge	2.0	512K/3.2		Free
DataPrism	**1.1**	**1MB/6.0**		**Free**
dBase Mac ★	1.01	1MB/4.1		Free
Deluxe Music Construction Set	2.5	512K/6.0.2		*
DesignStudio	2.0	1MB/6.0		*
DeskPaint ★	3.0	1MB/4.2		Free
Developer Stack	3.0	1MB/6.0		$15
Digital Darkroom	3.0	1MB/6.0		*
DiskDoubler	3.0	1MB/6.0.2	12/90	Free
DiskExpress II	2.04	1MB/6.0	11/90	*
DiskFit and Network DiskFit	2.0	1MB/6.0	7/91	*
DiskTop	4.0	1MB/6.0		*
Display AdBuilder	1.1	1MB/6.0.3		*
Dollars and Sense	4.1	512KE/3.2		*
Double Helix	3.5	1MB/6.0		*
Dreams	1.1	1MB/6.0.2		*
DynaPerspective	2.0	2MB/6.0.4		Free
DynoDex ★	1.21	1MB/6.0		Free
EarthQuest	2.0	1MB/6.0	4/91	*
Easy Color Paint	2.0	1MB/6.0.2	9/90	*
Empower II	4.0	1MB/4.2		Free
Falcon ★	2.2.1	1MB/3.2		$3
Family Heritage File	2.7.3	512K/4.2		*
Fastback II	2.1	512KE/4.1		$30
Fast Forms	2.0	1MB/6.0	11/90	$25
FastLabel	2.0	1MB/6.0		$36
FastTrack	1.5	512KE/5.5		$20
FaxGate	1.1	1MB/6.0		Free
FetchIt	2.0	512K/6.0.1		*
FileMaker Pro ★	1.02	1MB/4.2	2/91	Free
Filevision IV	1.1	1MB/4.2		$15
FilmMaker	2.0	5MB/6.0.3	3/91	*
Finale	2.6	1MB/6.0.2		Free
Findswell	2.01	512KE/3.2		*
Fontographer	3.2	1MB/4.2		*
FontShare	2.0	1MB/6.0		Free
FoxBase+/Mac ★	2.01	1MB/6.0		Free
FrameMaker	3.0	1MB/6.0	1/91	*
Freedom of Press ★	2.2	1MB/6.0		Free
FreeFlow	3.0	1MB/6.0.3		Free
Full Impact ★	2.0	1MB/6.0		$50
FullWrite Professional	1.5	2MB/6.0.2		*
Generic CADD	**1.1**	**1MB/6.0.5**		*
GeoQuery	2.0	1MB/6.0	10/90	*
Gofer	2.0	1MB/4.1		$25
Grammatik Mac	2.0	1MB/5.0	9/90	Free
Great Gantt	1.3	1MB/6.0	12/90	Free
Great Plains Accounting Series	5.35	1MB/6.0		*
HandOff II	1.1	1MB/6.0.2		Free
Handwriting Analyst ★	3.1	512K/3.2		$24.95
Help DA	3.0	*1MB/6.0		Free
HydroMac	2.0	1MB/6.0		*
HyperAnimator ★	1.5	1MB/6.0.3		$29.95
HyperCard	2.0	1MB/6.0.3		$49
HyperDA ★	1.2	512K/3.2		$10
HyperWindows ★	1.2	1MB/6.0.2		$20
Icon-It	2.0	1MB/6.0.2	9/90	$29
il:X Forms Designer	1.1	1MB/6.0	9/90	Free
ImageStudio	1.5	1MB/6.0		$99
InfoLogic Envelope ★	1.1c	512KE/4.0		$5
Insight Expert Accounts Payable	2.2	1MB/6.0		*

(continues)

Bold *= first time the product is being listed*

★ *= minor update.*

Req. *= min. RAM and system software required*

Rev. *= last time (in past year) reviewed this or an earlier version.*

Price *= cost for update to registered owners.*

* *= contact your dealer for update policy*

PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
Insight Expert Accounts Receivable	2.2	1MB/6.0.2		*
Insight Expert General Ledger	2.2	1MB/4.2		$99
Inspiration	3.0	1MB/4.2	11/90	*
Instant-Expert Plus	3.0	1MB/5.0		Free
Interactive Physics	1.2	1MB/6.0.2		$29.95
InTouch	1.1	1MB/6.0.5		Free
JetLink Express	2.0	1MB/6.0		$30
KidsTime ★	1.2	512K/3.2		$15
KiwiEnvelopes	3.0	512KE/4.1		$10
LanguageSystems Fortran ★	2.1	2MB/6.0.4		Free
LapLink Mac III	3.0	512K/2.0		*
LaserPaint Color II ★	1.02	1MB/6.0.3		Free
LetraStudio	1.5	2MB/6.0		$45
Light Checkbook Accounting	2.0	1MB/6.0.3		*
Lightspeed Color Layout System	2.0	1MB/6.0		*
Mac3270	2.0	1MB/6.0.3		*
MacAnalyst	2.0	2MB/6.0		$125
MacArchitrion	4.0	2MB/6.0.3		Free
MacClassAds	4.0	1MB/6.0		*
MacDraft	2.1	1MB/6.0.2	12/90	*
MacDraw II	1.1	1MB/6.0		*
MacEnvelope	5.0	512KE/3.2		$25
MacEnvelope Plus	2.0	512KE/3.2		$50
Macintosh Yellow Pages	1.1	1MB/6.0		*
MacFlow ★	3.1.5	1MB/6.0.3		Free
MacFortran for MPW	1.1	2MB/6.0.2		Free
MacLinkPlus/PC	5.0	1MB/6.0.2		*
MacLinkPlus/Wang VS	4.0	512KE/3.2		$45
MacMoney	3.5	512KE/4.0		$12
MacPhonebook	3.0	1MB/6.0		*
MacProject II	2.1	1MB/6.0		Free
MacRecorder	2.0	512K/3.2		*
MacroMind Director	2.0	2MB/6.0.2	10/90	$100
MacSafe II		512KE/4.2	10/90	*
MacSchedule	2.0	1MB/6.0		$30
MacTerminal	3.0	512K/3.2		$65
MacWrite II	1.1	1MB/6.0		Free
Managing Your Money	4.0	1MB/6.0.3		*
MapGrafix	2.0	4MB/6.0.3		Free
MarcoPolo	1.1	1MB/6.0		Free
MarketMaster	II+	1MB/6.0.3		$25
MarkUp	1.02	1MB/6.0		Free
Master Tracks Pro 4	4.12	1MB/4.1		$45
MathCAD ★	2.06	1MB/6.0.2		Free
Mathematica	2.0	1MB/6.0		*
MathType	2.1	512K/6.0.2		*
Matlab	1.2	1MB/3.0		*
MaxPage ★	1.2	512K/3.2		Free
McCPrint	2.1	512K/4.2		$25
Metronomefont	1.5	1MB/6.0		$5
MicroPhone II	3.0	512K/4.2		*
Microsoft Excel	3.0	1MB/6.0.2		*
Microsoft File	2.0	512K/3.2		*
Microsoft Mail	3.0	1MB/6.0.2		*
Microsoft PowerPoint	2.01	1MB/6.0		Free
Microsoft Word	4.0	512KE/3.2		*
Microsoft Works	2.0	512K/6.0		*
MindLink	**2.0**	**1MB/6.0**		*
MindWrite ★	2.1	512KE/4.2		*
MiniCad +	3.0	1MB/6.0	7/91	*
MockPackage Plus Utilities	4.4	512KE/3.2		$15
ModelShop II		1MB/6.0.2		$150
More ★	3	1MB/4.1	12/90	*
Multi-Ad Creator	2.2	2MB/6.0.3		*

Product	V.	Req.	Rev.	Price
MultiClip	2.0	512K/6.0.2	8/90	*
MultiLedger ★	1.1	512K/3.2		Free
MusicProse	2.2	1MB/6.0		Free
Music Publisher	2.5	1MB/6.0		*
MyQiskLabeler III		1MB/6.0		$25
M.Y.Q.B.	2.0	1MB/6.0		*
MyTimeManager	2.0	1MB/6.0		*
NetMinder Ethernet	1.2	2MB/6.0		*
Network Bundle for the Mac	3.0	512K/3.2		*
NightWatch ★	1.03	512KE/3.2		*
Nisus	3.04	1MB/6.0.2	2/91	Free
Now Utilities	2.0.3	1MB/6.0.2	7/91	*
QmniPage ★	2.1	1MB/6.0.2		Free
Qmnis 3 Plus/Express	2.0	512KE/3.2		*
Qn Schedule	2.0	1MB/3.0		*
P51 Mustang Flight Simulator	2.80	512K/3.2		$10
PacerLink	5.0	512K/5.0		*
Panorama	1.5	1MB/4.2		$29.95
Phonenet Liaison	3.0	1MB/4.2		$75
PhotoMac	1.5	2MB/6.0.3		$75
PhotoMacEdit	1.5	2MB/6.0.3		$30

Product	V.	Req.	Rev.	Price
The Phrase Thesaurus	2.0	1MB/6.0		Free
PICT Qetective	2.0	512KE/6.0		$20
PixelPaint	2.1	2MB/4.1		*
PixelPaint Pro	2.0	3MB/6.0.3		$125
Plains & Simple ★	1.06	1MB/3.2		*
PowerDraw	3.0	1MB/6.0		*
PowerStation ★	2.5.2	512K/4.1		Free
Practica Musica	2.1	512K/3.2		$10
Pro-Cite ★	1.3	512K/4.1		*
Professional Composer	2.3	1MB/6.0.3		Free
The Programmer's Qnline Companion	2.0	1MB/6.0.2		$10
Prograph	2.0	2MB/6.0	8/90	*
Property Management III		1MB/6.0.1		$100
PropsForms	2.0	1MB/6.0.3		Free
Prototyper ★	2.01	1MB/4.1		$79
Publish It	1.2	512KE/5.0		*
Publish It Easy	2.0	1MB/6.0	9/90	*
Publish or Perish	5.0	512K/4.2		$10
Pyro	4.0	512K/4.1		$15
QuarkXPress	3.0	2MB/6.0.5	11/90	$30
Quicken ★	1.5	512K/3.2		*
QuicKeys²	2.0.1	1MB/6.0.2	1/91	$49.95

Product	V.	Req.	Rev.	Price
QuickLetter	1.1.2	1MB/6.0		$30
QuickLock	2.0	512KE/3.2	10/90	Free
QuickMail	2.5	512KE/3.2		*
QuickShare	2.0	512KE/3.2		$75
QuickShot ★	2.1	1MB/4.2		$5
RagTime 3	3.04	2MB/6.0	8/90	$150
Read-It QCR Personal	2.1	1MB/6.0.3		$29
Read-It DCR Professional	3.0	2MB/6.0.3		*
ReadySetGo	4.5	1MB/6.0		*
Real Estate Investment Analysis	7.0	1MB/6.0	7/91	$99
Rendezvous	2.5	512KE/4.1		$15
Reports ★	1.2	1MB/6.0		Free
SAM	3.0	1MB/6.0	2/91	$29
ScheduleMaker ★	3.01	1MB/6.0		$25
ScreenSnap ★	2.2	1MB/4.2		*
Sentinel	2.2	1MB/6.0		$30
Shortcut	1.5	1MB/6.0		Free
SimMac	3.1	1MB/6.0.2		Free
Smart Alarms	3.1	1MB/6.0.2	12/90	$25
Smart Alarms & Multi-User Appointment Diaries	3.01	1MB/6.0.2	12/90	*

(continues)

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Scott Campbell

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PRODUCT UPDATES

Product	V.	Req.	Rev.	Price
SmartForm Assistant	1.1	1MB/6.0		Free
SmartForm Designer	1.1	1MB/6.0		Free
SmartScrap & The Clipper	2.0	1MB/6.0.3		$20
Snap ★	3.1	1MB/3.0		*
SnapJot	3.0	512K/4.1		*
SoftPC ★	1.3	2MB/6.0		*
Sound Designer Universal ★	1.5	512K/6.0.3		$45
Spelling Coach Professional	3.1	512KE/4.2		*
Spellswell ★	2.2	512K/3.2		$20
Spinnaker Plus	2.0	2MB/6.0		$45
Status Mac	2.0	1MB/6.0		*
Stepping Out II	2.0	1MB/4.1		Free
StickyBusiness	1.06	512KE/6.0.3		Free
StrataVision 3d	2.0	2MB/6.0.3		$99
StuffIt Classic	1.6	1MB/6.0		*
StuffIt Deluxe	2.0	1MB/6.0	7/91	Free
Suitcase II	1.2.6	512KE/4.1		$25
SUM	2.0	1MB/6.0		$39.95
Super 3D	2.1	512KE/6.0.2		Free
SuperANOVA	1.1	1MB/6.0.2		Free
SuperGlue II with GlueNotes	2.1	1MB/6.0		*
SuperLaserSpool	2.0.2	1MB/6.0		$30
SuperPaint	2.0	1MB/6.0.2		$50
SuperSpool	5.0	512K/4.1		$30
Synchronicity	3.0	512KE/3.2		$22.50
Systat	5.1	2MB/6.0		*
Teacher's Rollbook ★	2.2	512K/3.2		$17.95
Tempo II	1.02	1MB/4.2		*
TextPert ★	3.01	1MB/6.0		Free
TextScan	3.04	1MB/6.0		$69.95
Theorist	1.1	1MB/6.0		*
Think C	4.0	1MB/5.0		*
Think Pascal	3.0	1MB/5.0	11/90	$69
ThunderWorks	1.0.3	1MB/6.0.2		$69
Timbuktu	4.0	1MB/4.1	10/90	*
Timbuktu/Remote	2.0	1MB/4.1		*
Timeslips III	2.0	1MB/6.0.2		*
Toolkit	2.4	2MB/6.0.5		$49.95
TrueBASIC ★	2.02	1MB/6.0		Free
TypeReunion	1.01	1MB/6.0		Free
TypeStyler	1.5	1MB/4.1		*
UNITize ★	1.3	512KE/3.2		$20
VersaCAD/ Macintosh Edition ★	2.11	1MB/6.0		Free
Virex	3.1	1MB/4.2		$15
Virtual 2.0 for 030	2.03	1MB/4.2		Free
Virtual 2.0 for Mac II	2.03	1MB/4.2		Free
Virtual 2.0 for Mac Plus	2.02	1MB/4.2		Free
Wall Street Investor	3.0	1MB/5.0		$150
White Knight II	11.6	1MB/6.0.2		$35
WillMaker	4.0	512KE/4.2	3/91	$18.50
Wingz ★	1.1	1MB/6.0		Free
Word Finder	2.0	512K/3.2		*
WordPerfect for the Macintosh	2.0	1MB/6.0.5	7/91	$89
WorksPlus Spell	2.0	1MB/6.0.3		$35
WriteNow	2.2	512K/4.2	9/90	$49

To have products listed in this section, send upgraded software, an outline of changes since the previous release (indicate if it's a maintenance upgrade), upgrade price, minimum RAM and system software, suggested retail price, company name, mailing address, and phone number to *Updates, Macworld,* 501 Second St., San Francisco, CA 94107.

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Mac LC 2/40 ..... $1799
Mac Classic 2/40 ..... $1299
Classic 3mb Upgrade $199
CI Cache Card $245

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GoldStar 1450 Plus $410
PRISM 14" Color Monitor ... $390
Seiko Trinitron 14" $579
Ikegami Trinitron 20" $1869
RasterOps 19" Mono $1199
RasterOps ClearVue/GS $1499
RasterOps 19" 8L System $4159
RasterOps 19" 24L System .. $5449
RasterOps 24stv $1179
RasterOps 264 ..... $399
RasterOps 24s $530
RasterOps 24si $739
RasterOps 264/SE30 ..... $599
RasterOps 364 ..... $799
Ikegami 20" 24bit Bundle ... $3499
Ikegami 20" 8 bit System $2699
PRISM 8 bit Color Board $289
E-Machines 16" (8bit) $2119
E-Machines 19" (8bit) $4219
RADIUS ..... call

Miscellaneous Peripherals

Abaton Color Scan 300 ..... $1745
MicroTek 300zs Scanner $1699
MicroTek 300gs Scanner $1189
Zoom v.42bis Modem $199
Zoom 2400 Modem $89
Abaton InterFax 24/96 ..... $305
NEC CDR-36 w/ interface $489
Farallon Mac Recorder $155
Mac 101 Keyboard $139
DataDesk Switchboard $158
SI NuBus Exansion Chassis .. $1099
MicroNet 45mb Removable .. $649
MicroNet 90mb Removable .... call
Syquest Cartridges $81
PhoneNet 10 pack $159
PhoneNet Connector $25
Voltaire 6 Line Surge Prot. $39
Wacom Graphics Tablets ..... call
Over 3,000 other products ... call

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QMS PS410 ..... $2049
TI MicroLaser/PS35 ..... $1639
NEC SilentWriter II $1599
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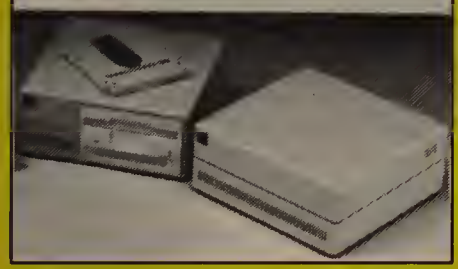
*Mean Time Between Failure is the average life expectancy of a drive.
24 hour factory replacement available for 5.25" drives for additional fee.



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600MB F/H	$1624	$1724
630MB RUNNER II	$2038	$2138
1.2 Gig	$2548	$2648

Quantum Drives

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52MB 3.5" LPS	$278	$348
105MB 3.5"	$358	$458
105MB 3.5"LPS	$448	$498
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A Guide to Products Featured in This Issue

This listing provides companies and phone numbers for products mentioned in this issue.

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Apple Computer 408/996-1010.
Applied Engineering 214/241-6060; fax 214/484-1365.
ATTO Technology 716/688-4259; fax 716/636-3630.
DayStar Digital 404/967-2077, 800/962-2077; fax 404/967-3018.
Dove Computer Corp. 919/763-7918; fax 919/251-9441.
MacProducts USA 512/343-9560, 800/622-3475; fax 512/343-6141.
Micron Technology 206/386-3800, 800/642-7661.
Mobius Technologies 415/654-0556, 800/669-0556; fax 415/654-2834.
NewLife Computer Corp. 613/592-5080; fax 613/592-9738.
Novy Systems 904/427-2358.
Radius 408/434-1010, 800/227-2795; fax 408/434-0127.
Siclone Sales & Engineering Corp. 408/456-5060, 800/767-8207; fax 408/456-0107.
Total Systems 503/345-7395, 800/874-2288; fax 503/343-6293.
UR Micro 716/689-1600, 800/876-4276; fax 716/689-0062.

Crystal Ball Market Engineering Corp.; 303/298-0020, 800/289-2550; fax 303/292-5004.
digiMatic FEB Software; 804/222-2215; fax 804/226-1934.
DiskFit SuperMac Technology; 408/245-2202; fax 408/735-7250.
Enchanted Journey Jumping Frog Productions; 801/451-0517, 800/523-3764.
GraceLAN Technology Works; 512/794-8533, 800/688-7466; fax 512/794-8520.
Image Grabber Sabastian Software; 206/861-0602.

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APS 816/478-8300, 800/233-7550; fax 816/478-4596.
CMS Enhancements 714/222-6000; fax 714/549-4004.
Cranel 614/433-0045, 800/288-3475.
Cutting Edge 307/789-0582; fax 307/789-8516.
Deltaic Systems 408/441-1240, 800/574-1240; fax 408/437-1719.
DJK Development 313/254-2632; fax 313/254-1121.
Ehman 307/789-3830, 800/257-1666; fax 307/789-4656.
EMac, a Division of Everex Systems 415/683-2222, 800/821-0806; fax 415/683-2151.
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GCC Technologies 617/890-0880, 800/422-7777.
Hard Drives International 602/967-5128, 800/234-3475; fax 602/829-9193.
La Cie 503/691-0771, 800/999-0143.
Liberty Systems 408/983-1127; fax 408/243-2885.
MacDirect 800/621-8461.
MacLand 602/820-5802, 800/333-3353.
MacProducts USA 512/343-9560, 800/622-3475; fax 512/343-6141.
MicroNet Technology 714/837-6033; fax 714/837-1164.
Microtech International 203/468-6223, 800/626-4276.
Mirror Technologies 612/633-4450, 800/654-5294; fax 612/633-3136.
Optima Technology Corp. 714/476-0515; fax 714/476-0613.
PLI 415/657-2211, 800/288-8754.
Procom Technology 714/549-9449; fax 714/549-0527.
Relax Technology 415/471-6112; fax 415/471-6267.
Rodime Systems 407/994-5585, 800/588-9390; fax 407/997-6197.
Storage Dimensions 408/879-0300; fax 408/377-4988.

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Apple Computer 408/996-1010.
Applied Engineering 214/241-6060; fax 214/484-1365.
Aurora Industries 203/624-9018, 800/426-1591; fax 203/562-8191.
Benchmark Labs 305/771-9759, 800/628-4726.
Beverly Hills Computer 213/273-3710, 800/426-8166.
Bottom Line Distributors 900/420-3737.
Brainstorm Products 415/964-2131; fax 415/964-2135.
CDA Computer Sales 201/832-9004, 800/526-5313.
CDC Enterprise 714/630-4633, 800/373-5353.
The Chip Merchant 619/268-4774, 800/426-6375.
Clearpoint Research Corp. 508/435-2000, 800/253-2778.
Computer Care 612/371-0061, 800/950-2273; fax 612/371-9342.
Data Memory Systems 508/683-2325, 800/662-7466.
DayStar Digital 404/967-2077, 800/962-2077; fax 404/967-3018.
Diamond Computer Resources 512/219-1222, 800/541-7126.
Digi-Graphics 801/544-2009.
Dove Computer Corp. 919/763-7918; fax 919/251-9441.
Dr. Mac 818/501-6581, 800/825-6227.
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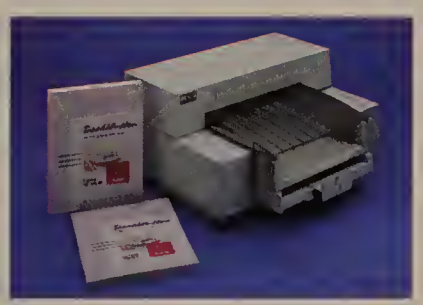

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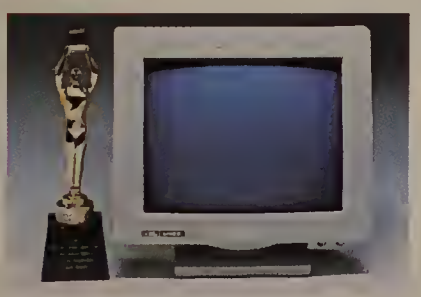

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45-47	Apple	—	—
324-325	APS	—	800/233-7550
154	Articulate Systems	74	800/443-7077
241	Asante Technologies	24	800/662-9686
318	Aurora Systems	18	800/426-1591
322	Beverly Hills Computer	27	800/426-8166
41	Bitstream	90	—
316-317	Bottomline	—	900/420-3636
8	Bottomline	—	900/420-3636
IBC	Caere Corp.	1	800/535-SCAN
322	Cambridge Computer (ERI Direct)	19	800/535-3252
258-259	Canon USA	164	—
150-151	Claris	—	800/544-8554
IFC-P1	Claris	—	800/544-8554
166	Computer Business Today	—	—
290	Computer Business Today	—	—
235-238	CompuAdd	—	—
149	Contemporary Cybernetics	188	804/873-0900
22	Curtis Manufacturing	20	603/532-4123
34	Dantz Development	259	415/846-0293
30	Databased	145	512/342-8687
223	DCA MacIRMAtrac	71	800/348-DCA1
29	Deneba Software	346	800/6CANVAS
31	Deneba Software	57	800/6CANVAS
13	Design CAD, Inc	336	918/825-4848
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36-37	Digital Equiptment Corp.	—	800/3434040
343	Digital Vision	242	800/346-0090
323	Diskette Connection	79	800/654-4058
312-313	Dr. Mac, Inc	368	800/825-6227
14-15	E-Machines	303	800/34GRAPH
10-11	Eastman Kodak	377	800/344-0006
278	Educorp	146	—
6-7	Ehman, Inc	144	800/257-1666
302-303	ERI Direct	184	800/535-3252
160	Fifth Generation Systems	73	800/873-4384
34	GDT Softworks	317	800/663-6222
16	Generation Systems	170	800/325-5811
276	Genstar Rental Electronics	—	800/422-3300
72	Graphsoft	46	301/461-9488
64	Griffin Computer	110	—
275E	Icograda	129	—
283	IDG Books	—	—
46	Image Club	—	403/262-8008
28	Inline Design	111	203/364-0063
140	Insignia Solutions	72	—
164	Iomega	260	800/777-6649
260	James Burn International	107	—
227	Jasmine	126	800/347-3228
275W	Kensington Microware	255	415-572-2700
BC	Kensington Microware	6	—
257	Key Tronic	289	800/262-6006
24-25	La Cie	199	800/999-0143
75	La Cie	195	800/999-0143
261	La Cie	52	800/999-0143
272	LaserMaster	342	612/944-9696
230	Linotype-Hell	97	—
345	Mac and More	85	800/MAC-0052
297	Mac Direct	140	800/621-8469
66-67	MacAcademy	168	800/527-1914
315	MacCenter	—	800/950-3726
48-61	MacConnection	—	800/334-4444
26	MacFriends	109	800/622-8804
273	MacFriends	270	800/622-8804
291	MacFriends	58	800/622-8804
292	Macintosh Masters IV	—	—
308-311	MacLand	264	800/333-3353
321	MacProducts USA	175	800/622-3475
296	MacSource	48	800/367-2622
12	MacTable/ Scanco	296	800/722-6263
314	MacTel Technology	142	800/950-8411
167-175	MacWarehouse	240	800/455-9677
285-289	Macworld Expo Boston '91	—	—
76-139	Mac Zone, The	70	800/248-0800
271	Mainstay	284	818/991-6540
219	Mass Micro Systems	207	800/522-7979
270	Mathsoft	34	800/MATHCAD
65	Microcom	41	617/551-1021
142	Microseeds	228	813/882-8635
32-33	Microsoft	—	800/541-1261
257	Microsoft	—	800/541-1261
232	Microtech International	80	—
35	Mirror Technologies	243	800/633-4450
68	Mirror Technologies	112	800/654-5294
248	Mirror Technologies	125	800/654-5294
279W	Mobius	89	800/669-0556
265	NEC Technologies	314	800/NEC-INFO
280	NEC Technologies	148	800/NEC-INFO
262	New Era	77	305/255-5586
158	NewGen	244	714/641-8900
158	NewGen	246	714/641-8900
344	Newlife Microsystems	294	800/267-7231
243	Ocean Microsystems	33	—
277	OCLI	374	800/545-OCLI
247	Odesta	238	800/334-6041
251	ON Technology	13	617/876-0900
70	Orange Micro	31	—
218D	Pacer Software	91	619/454-0565
27	Pacific Data	—	619/597-4633
279E	Paper Direct	64	—
74	Paragon Concepts	253	800/922-2993
148	Peripheral Vision	98	—
71	Pinnacle Micro	132	800/553-7070
73	Pinnacle Micro	266	800/553-7070
46	Quantum Leap	82	305/885-9985
42-43	QuarkXPress	65	800/356-9363
229	QuarkXPress	295	800/356-9363
5	RagTime USA	102	415/780-1800
64	Ramnet	138	408/298-9206
38	RasterOps	15	800/468-7600
40	Salient	39	—
256	Secure-It	239	800/451-7592
9	Shiva Corp.	—	800/458-3550
218A	Sitka Corp.	—	—
146-147	SoftSync BLOC Publishing	367	800/993-2537
144	Software Security	95	800/333-0407
218B	Solutions Inc.	119	—
143	SPSS, Inc	210	800/45-STATS
300	Sterling Solutions	81	800/247-9712
152	Storage Dimensions	127	408/879-0300
30	Strategic Mapping	131	408/985-7400
19	Supermac	118	—
62	Supermac	88	—
252	Symantec	96	—
284	Symantec	117	800/526-5034
44	Symmetry	115	—
254-255	Texas Instruments	313	800/527-3500
145	3M Storage Data	23	800/888-1889
319	Thirdwave	114	800/284-0486
301	US Computer Merchant	285	800/888-8779
245	Wacom	116	—
218C	Webster Computer	123	800/457-0903
298	Wholesale 54	122	—
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11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

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411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
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1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100
101	102	103	104	105	106	107	108	109	110
111	112	113	114	115	116	117	118	119	120
121	122	123	124	125	126	127	128	129	130
131	132	133	134	135	136	137	138	139	140
141	142	143	144	145	146	147	148	149	150
151	152	153	154	155	156	157	158	159	160
161	162	163	164	165	166	167	168	169	170
171	172	173	174	175	176	177	178	179	180
181	182	183	184	185	186	187	188	189	190
191	192	193	194	195	196	197	198	199	200

201	202	203	204	205	206	207	208	209	210
211	212	213	214	215	216	217	218	219	220
221	222	223	224	225	226	227	228	229	230
231	232	233	234	235	236	237	238	239	240
241	242	243	244	245	246	247	248	249	250
251	252	253	254	255	256	257	258	259	260
261	262	263	264	265	266	267	268	269	270
271	272	273	274	275	276	277	278	279	280
281	282	283	284	285	286	287	288	289	290
291	292	293	294	295	296	297	298	299	300
301	302	303	304	305	306	307	308	309	310
311	312	313	314	315	316	317	318	319	320
321	322	323	324	325	326	327	328	329	330
331	332	333	334	335	336	337	338	339	340
341	342	343	344	345	346	347	348	349	350
351	352	353	354	355	356	357	358	359	360
361	362	363	364	365	366	367	368	369	370
371	372	373	374	375	376	377	378	379	380
381	382	383	384	385	386	387	388	389	390
391	392	393	394	395	396	397	398	399	400

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401	402	403	404	405	406	407	408	409	410
411	412	413	414	415	416	417	418	419	420
421	422	423	424	425	426	427	428	429	430
431	432	433	434	435	436	437	438	439	440
441	442	443	444	445	446	447	448	449	450
451	452	453	454	455	456	457	458	459	460
461	462	463	464	465	466	467	468	469	470
471	472	473	474	475	476	477	478	479	480
481	482	483	484	485	486	487	488	489	490
491	492	493	494	495	496	497	498	499	500
501	502	503	504	505	506	507	508	509	510
511	512	513	514	515	516	517	518	519	520
521	522	523	524	525	526	527	528	529	530
531	532	533	534	535	536	537	538	539	540
541	542	543	544	545	546	547	548	549	550
551	552	553	554	555	556	557	558	559	560
561	562	563	564	565	566	567	568	569	570
571	572	573	574	575	576	577	578	579	580
581	582	583	584	585	586	587	588	589	590
591	592	593	594	595	596	597	598	599	600

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Page No.	Advertiser	Reader Svc. No.
SOFTWARE		
	BUSINESS	
256	Abacus Concepts	50
343	AbraMacDabra	54
268	Aldus	—
294.295	Aldus	—
IBC	Caere Corp.	1
150-151	Claris	—
IFC-P.1	Claris	—
30	Databased	145
271	Mainstay	284
270	Mathsoft	34
257	Microsoft	—
32-33	Microsoft	—
247	Odesta	238
251	ON Technology	13
5	RagTime USA	102
256	Secure-It	239
146-147	SoftSync/BLOC Publishing	367
143	SPSS, Inc	210
30	Strategic Mapping	131
	VRETICLE	
256	Abacus Concepts	50
343	AbraMacDabra	54
146-147	SoftSync/BLOC Publishing	367
	DATA MANAGEMENT	
247	Odesta	238
5	RagTime USA	102
30	Strategic Mapping	131
44	Symmetry	115
	WORD PRECESSING	
74	Paragon Concepts	253
20-21	Wordperfect	—
	CAD/CAM	
13	Design CAD, Inc	336/337
72	Graphsoft	46
	COMMUNICATION	
223	DCA MacIRMAtrac	71
73	Pinnacle Micro	266
71	Pinnacle Micro	132
	EDUCATIONAL	
66-67	MacAcademy	168
	FONTS	
41	Bitstream	90
46	Image Club	—
	GRAPHICS/DTP	
268	Aldus	—
294-295	Aldus	—
150-151	Claris	—
IFC-P.1	Claris	—
29	Deneba Software	346
31	Deneba Software	57
343	Digital Vision	242
46	Image Club	—
42.43	QuarkXPress	65
229	QuarkXPress	295
62	Supermac	88
19	Supermac	118
44	Symmetry	115
	ENTERTAINMENT	
28	Inline Design	111
	NETWORKING	
223	DCA MacIRMAtrac	71
36-37	Digital Equiptment Corp.	—
140	Insignia Solutions	72
65	Microcom	41
218D	Pacer Software	91
9	Shiva Corp.	—
218B	Solutions Inc.	119
218C	Webster Computer	123
	LANGUAGE	
218C	Webster Computer	123
	SECURITY	
252	Symantec	96
284	Symantec	117
	UTILITIES	
34	Dantz Development	259
160	Fifth Generation Systems	73
34	GDT Softworks	317
65	Microcom	41
142	Microseeds	228
251	ON Technology	13
40	Salient	39
256	Secure-It	239
252	Symantec	96
284	Symantec	117
	MISCELLANEOUS	
IBC	Caere Corp.	1
34	GDT Softworks	317
46	Quantum Leap	82
HARDWARE		
	COMPUTER SYSTEMS	
322	Cambridge Computer (ERI Direct)	19
302-303	ERI Direct	184
276	Genstar Rental Electronics	—
26	MacFriends	109
291	MacFriends	58
273	MacFriends	270
	PRINTERS	
156	Abaton	43
45-47	Apple	—
10-11	Eastman Kodak	377
272	LaserMaster	342
230	Linotype-Hell	97
345	Mac and More	85
265	NEC Technologies	314
280	NEC Technologies	148
154	NewGen	244/246
27	Pacific Data	—
254-255	Texas Instruments	313
	BOARDS	
241	Asante Technologies	24
16	Generation Systems	170
70	Orange Micro	31
38	RasterOps	15
64	Ramnet	138
	DIGITIZERS/SCANNERS	
162	Advanced Vision Research	47
75	La Cie	195
	DISPLAY	
14-15	E-Machines	303
6-7	Ehman, Inc	144
261	La Cie	52
35	Mirror Technologies	243
68	Mirror Technologies	112
279W	Mobius	89
	MODEMS	
9	Shiva Corp.	—
	HARD DRIVES/STORAGE	
149	Contemporary Cybernetics	188
6-7	Ehman, Inc	144
160	Fifth Generation Systems	73
164	Iomega	260
227	Jasmine	126
24-25	La Cie	199
219	Mass Micro Systems	207
232	Microtech International	80
248	Mirror Technologies	125
243	Ocean Microsystems	33
148	Peripheral Vision	98
73	Pinnacle Micro	266
71	Pinnacle Micro	132
300	Sterling Solutions	81
152	Storage Dimensions	127
	VIDEO	
258-259	Canon USA	164
70	Orange Micro	31
38	RasterOps	15
	EXPANSIONS/UPGRADES	
344	Newlife Microsystems	294
225	Xante	—
	SOFTWARE SECURITY	
144	Software Security	95
	INPUT DEVICES	
158	Articulate Systems	74
22	Curtis Manufacturing	20
BC	Kensington Microware	6
267	Key Tronic	289
245	Wacom	116
	MISCELLANEOUS	
278	Educorp	146
276	Genstar Rental Electronics	—
260	James Burn International	107
277	OCLI	374
27	Pacific Data	—
SERVICES		
	TRAINING	
66-67	MacAcademy	168
ACCESSORIES		
	FLOPPY	
45	3M Storage Data	23
	FURNITURE	
4	Anthro	—
12	MacTable/ Scanco	296
	MISCELLANEOUS	
275W	Kensington Microware	255
12	MacTable/ Scanco	296
277	OCLI	374
MAIL ORDER		
324-325	APS	
318	Aurora Systems	18
322	Beverly Hills Computer	27
316-317	Bottomline	—
8	Bottomline	—
322	Cambridge Computer (ERI Direct)	19
323	Diskette Connection	79
312-313	Dr. Mac, Inc	368
278	Educorp	146
302-303	ERI Direct	184
297	Mac Direct	140
76-139	Mac Zone, The	70
315	MacCenter	—
48-61	MacConnection	—
26	MacFriends	109
291	MacFriends	58
273	MacFriends	270
308-311	MacLand	264
321	MacProducts USA	175
296	MacSource	48
314	MacTel Technology	142
167-175	MacWarehouse	240
262	New Era	77
279e	Paper Direct	64
319	Thirdwave	114
301	US Computer Merchant	285
298	Wholesale 54	122

PRODUCT INDEX

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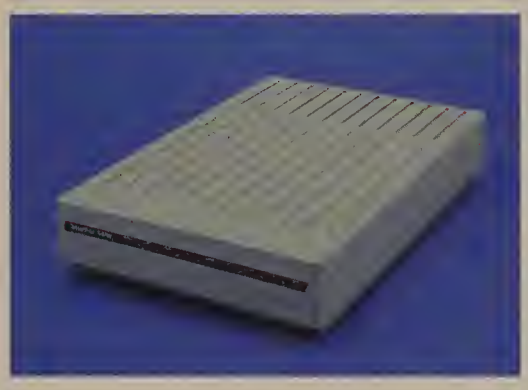

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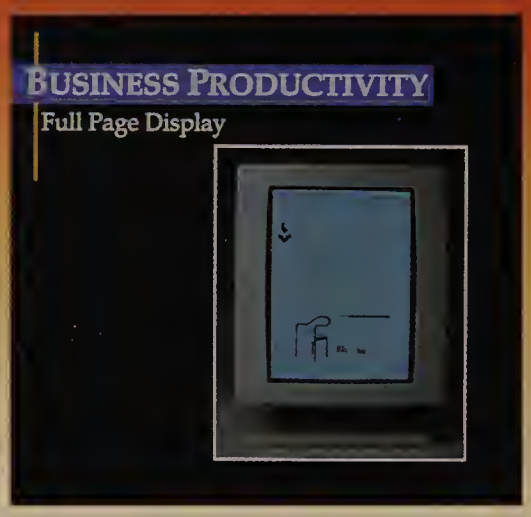

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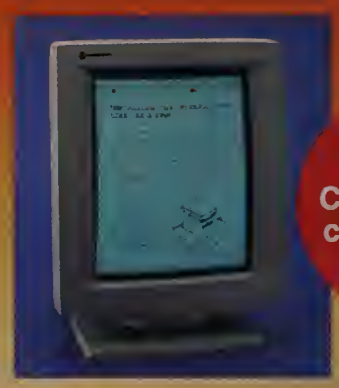

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ADOBE SYSTEMS
- Adobe Illustrator 3.0.with ATM 348
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ALDUS
- Pagemaker. 489
- Freehand 2.0 388
- Persuasion....319

ALADIN
- Shortcut 1.5 45
- Stuffit Deluxe 2.0 62

ASD
- FileGuard 2.5....137

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- DeltaGraph 119
- Taste....59

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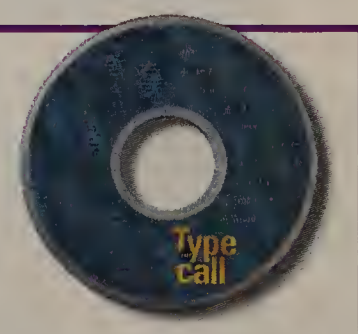
- DynaPerspective 3D 599

FARALLON
- Media Tracks 185
- Timbuktu....92
- Timbuktu Remote 2.0 122
- Timbuktu 3.1 30 Pack....1275

FISHER IDEA SYSTEMS
- Idea Fisher....422

FRANKLIN SOFTWARE
- Language Master....57



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- Fortran with MPW....398
- Wild Things....119

MAGNA
- Empower I 119
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MAINSTAY
- MacFlow 3.5 168

MANAPRO
- General Ledger Pro 799

MECA
- Managing Your Money 128

MICROCOM
- Carbon Copy Mac....115
- Virex 59
- Virex 10 Pack 345

MICROFRONTIER
- Enhance 199

MICROLYTICS
- Inside Information 39
- Gofer....52
- Wordfinder 34

MICROSOFT
- Word 4.0 248
- Excel 3.0 New Version....Special 299
- Help for Excel with Excel purchase ..25
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- Multi-Ad Creator 449
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ON TECHNOLOGY
- On Location 71

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- Nisus....238

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SALIENT
- DiskDoubler....42

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- Serius Programmer 194
- Serius Developer 324

SITKA
- Network Bundle for MAC....185

SOFTWARE DISCOVERIES
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SYMANTEC
- Norton Utilities 86
- SAM....65
- SUM II....104
- Think C 4.0 159

SYMMETRY
- Key Plan 199
- Manah....79

SYSTEMS COMPATIBILITY
- Software Bridge 69

TACTIC SOFTWARE
- Magic Typist 39
- Icon It!....39
- Sound Clips 39
- ArtClips 39
- ArtFonts 39
- FontShare....125

TIMEWORKS
- Publish it! Mac 219
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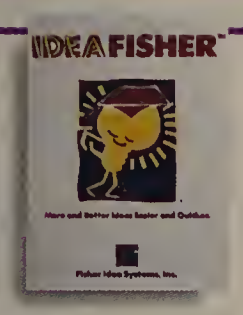

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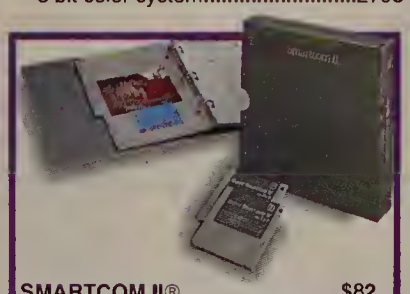

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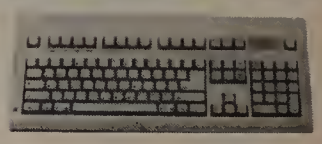

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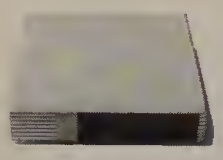

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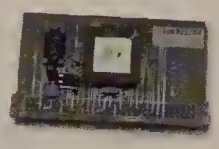

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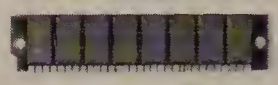

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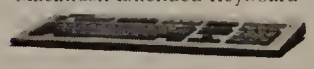

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2 year warranty on Quantum drives. 5 year warranty upgrade for $50 at time of purchase only.

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Capacity	Internal	External	Access
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Dove Fax	$294	Dove Fax Plus	$357

(Modems 100% Hayes Compatible.)

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5 year warranty on memory kits

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40MB	Europa	$ 468
100MB	Europa	$ 774

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170MB	Impact	$ 976

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Call for details about higher capacity drives, used and refurbished drives, and volume pricing.

Contest Rules: Winners must be 18 years or older. All taxes are the responsibility of the winner. Mail entries must be received by August 1st, 1991. Drawing will be held on August 9th at the MacWorld Expo in Boston at 2pm, booth #612. The winner will be notified by mail. No purchase necessary. Contest void where prohibited.

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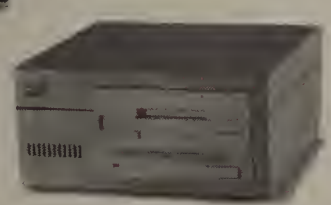
The 45R uses SyQuest cartridges, availabe as single, combo or dual removables.



OptiDisk™ 600 —the least expensive way to store your data.

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52L*	(Quantum)	280	400
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120	(Quantum)	640	760
170	(Quantum)	690	810
210	(Quantum)	750	870

**Low power internal drives that meet Classic, IIsi & LC power specs.*

Seagate MacWren Drives

	Internal	External
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330	1450	1600
330*	1290	1410
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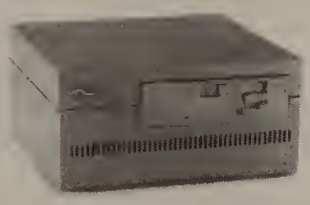
**Highest capacity internal drives for Mac cx, ci, SE and SE30. These also work in the II and IIfx.*



UltraCombo

300/45R	$1990
300/150t	2040
600/DAT	3790
650/Optical	5450
1000/DAT	4490
1000/Optical	5950
2000/DAT	7290

Over 30 combinations available.

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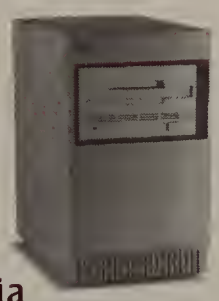

Combo Drives

105/45R	$1050
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170/DAT	2400
210/DAT	2500
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425/DAT	3340

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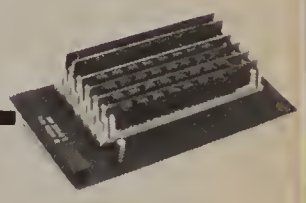
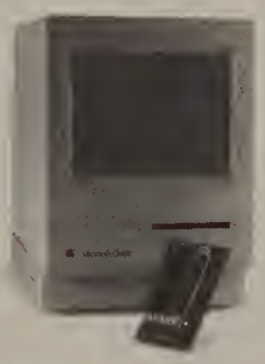
Macworld finds our drives quietest.

"The quietest of the 64 drives tested...fast—three of the twelve fastest tested were Third Wave's"...and finally, "a good bargain."
-Macworld, *March 1991.*



SIMMpack for the Classic



SIMMpack, the new Classic upgrade board from Logica makes use of your old 256k SIMMs in 1mb Classics. Save at least $50 and as much as $250 on every Classic by allowing the re-use of 256K SIMMs. Available in four configurations:

SIMMpack

Board only (0 mb)	$45
(0 mb) with drive bracket*	63
(0 mb) w/40mb Maxtor	315
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*Remove SIMMs & drive from IIsi, install in Classic.

LC VRAM SIMM & 2 mb SIMM now available.

SIMMs— lowest prices, no CFCs

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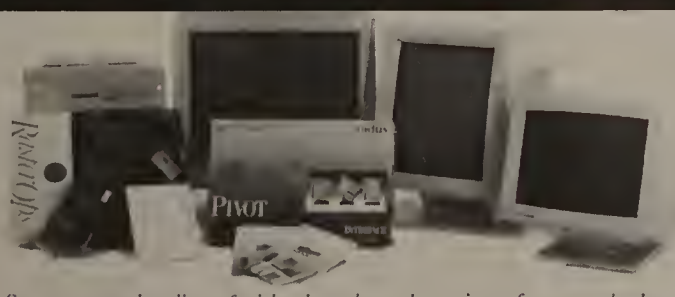
XAPSHOT	$429
XAPSHOT Bundle— 24 bit frame grabber	749



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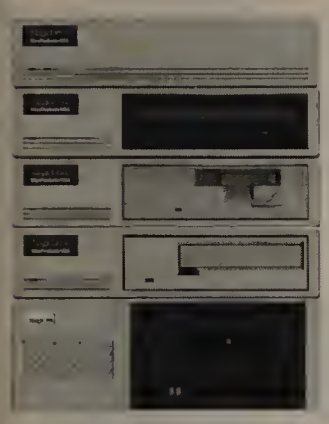

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Quantum mechanisms. 2 year warranty.

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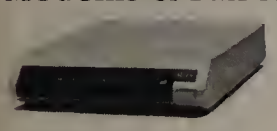

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2400 V.42 bis MNP-5 Modem....$175
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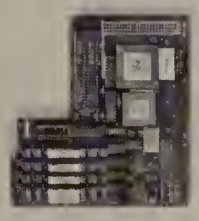

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Magic RailGun 030 "IIci computing power in a Plus" -MacUser

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RAM-disk, improved SCSI throughput. Available math coprocessor. 2 year warranty. Available for the Plus, SE, & Classic. **Coming Soon- RailGun 040!**

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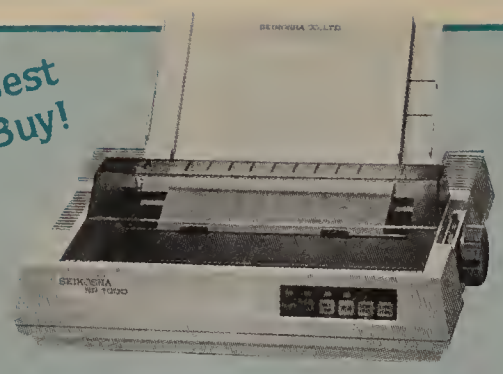

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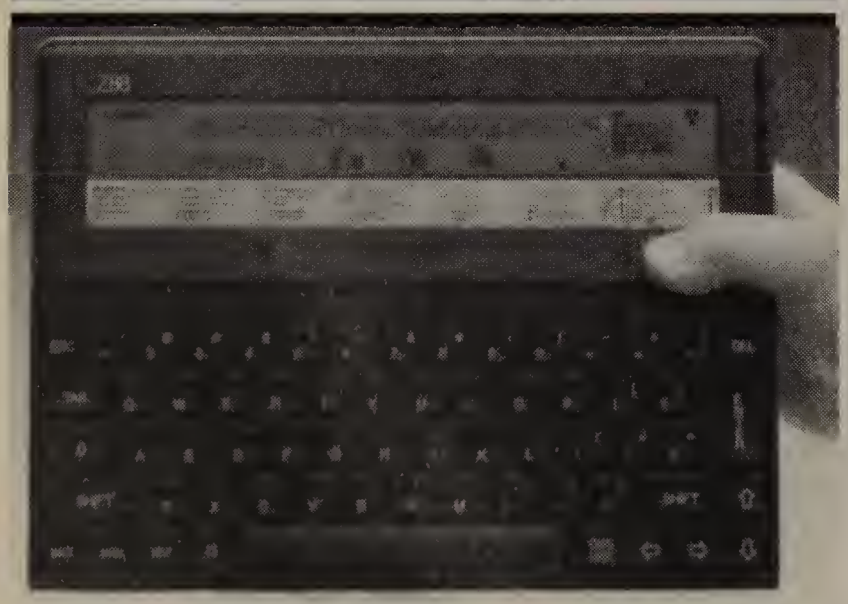

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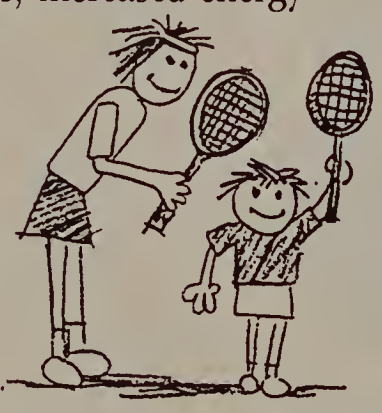

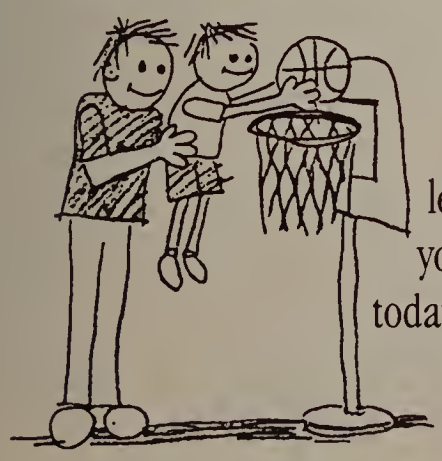

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Hardware

Bar Code 328
Computer Systems 328
Emulators 330
Memory Upgrade 330
Peripherals 331
Printers 332

Software

Architecture 332
Air Travel 332
Bar Code 332
Business 333
CAD/CAM 333
Clip Art 333
CD/ROM 334
Data Base 334
Desktop Publishing 334
Duplication 335
Educational 335
Entertainment 336
Engineering 335
Fonts 336
Genealogy 336
Graphics 336
Graphics Translators 336
HyperCard Stacks 337
Import/Export 337
Inventory Control 337
Languages 337
Lottery 337
Medical 337
Multimedia 338
Music/MIDI 338
Nutrition 338
Programming Tools 338
Property Management 338
Public Domain 339
Real Estate 339
Religion 339
Restaurant 339
Sales/Marketing 339
Scientific 339
Sign Making 340
Statistics 340

Services

Computer Insurance 340
Computer Repair 340
Data Conversion 340
Desktop Publishing 340
Disk Duplication 340
Laser Recharge 341
Multimedia 341
Repair 341

Accessories

Furniture 341
Mouse Pads 341
Supplies 342

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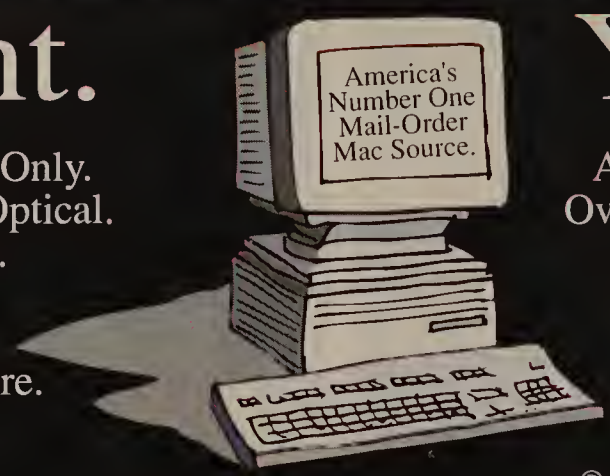

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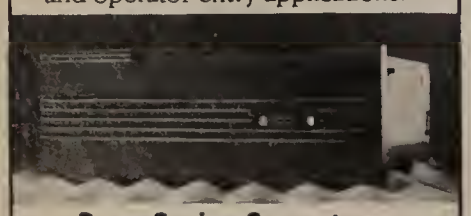

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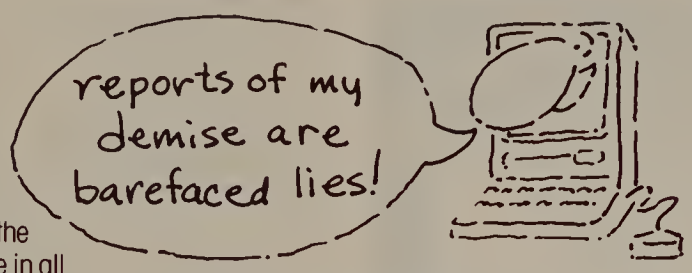

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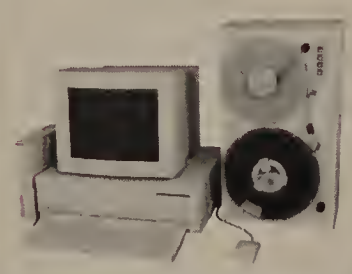

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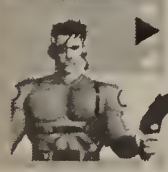

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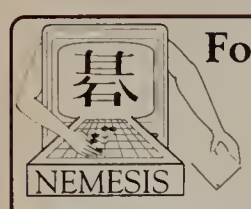

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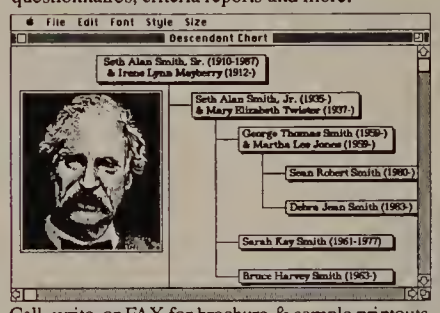

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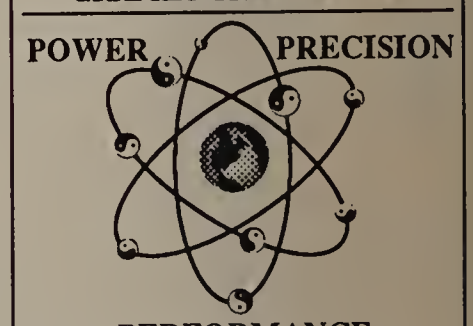

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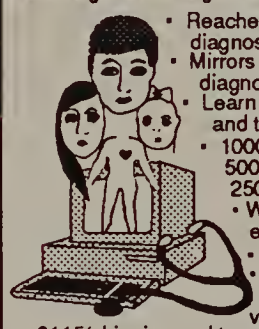

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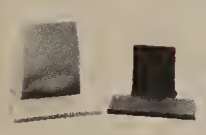

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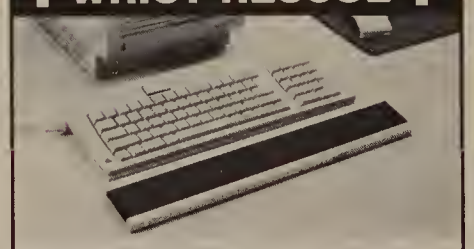

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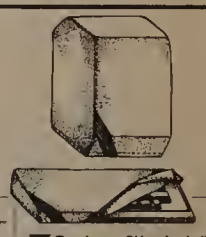

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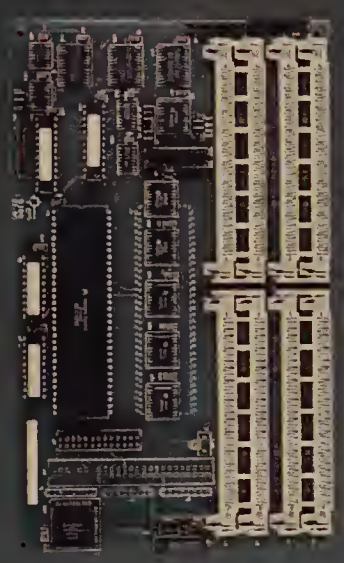

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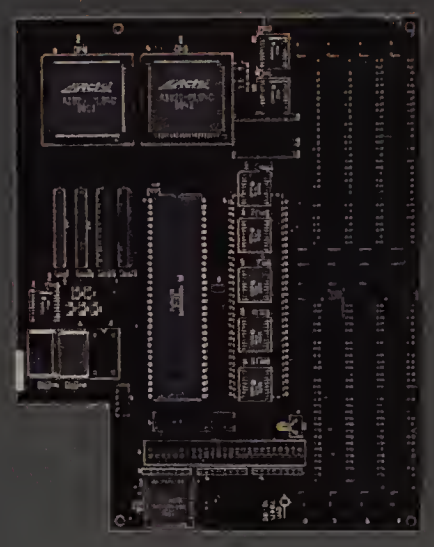

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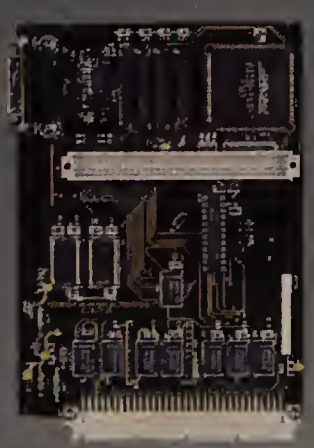

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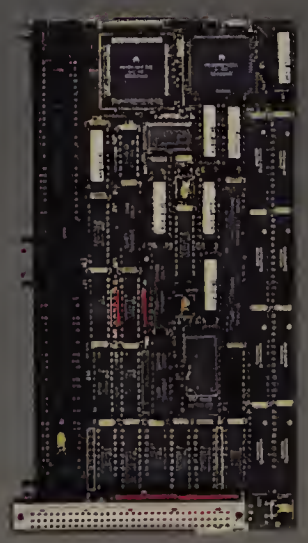

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BEST-SELLERS

BUSINESS SOFTWARE

Months on chart	Last month	This month		
74	1	1	**Microsoft Word**	Microsoft Corporation
53	2	2	**Microsoft Works**	Microsoft Corporation
65	3	3	**Microsoft Excel**	Microsoft Corporation
61	4	4	**Aldus PageMaker**	Aldus Corporation
26	5	5	**FileMaker Pro**	Claris Corporation
50	6	6	**MacWrite II**	Claris Corporation
27	7	7	**QuarkXPress**	Quark
26	10	8	**WordPerfect**	WordPerfect Corporation
13	8	9	**Quicken**	Intuit
21	9	10	**Adobe Illustrator**	Adobe Systems

EDUCATION SOFTWARE

Months on chart	Last month	This month		
9	2	1	**Where in Time Is Carmen Sandiego?**	Brøderbund Software
41	3	2	**Reader Rabbit**	The Learning Company
28	1	3	**Where in the World Is Carmen Sandiego?**	Brøderbund Software
15	4	4	**Where in the USA Is Carmen Sandiego?**	Brøderbund Software
54	5	5	**Math Blaster**	Davidson & Associates

ENTERTAINMENT SOFTWARE

Months on chart	Last month	This month		
19	1	1	**SimCity**	Maxis
17	2	2	**Tetris**	Spectrum HoloByte
4	3	3	**SimEarth**	Maxis
27	4	4	**Falcon**	Spectrum HoloByte
11	5	5	**Welltris**	Spectrum HoloByte

NETWORK/DATA COMMUNICATIONS

Months on chart	Last month	This month		
53	1	1	**TOPS**	Sitka Corporation
48	2	2	**AppleShare**	Apple Computer
10	3	3	**Timbuktu**	Farallon Computing
7	4	4	**White Knight**	FreeSoft
11	—	5	**MicroPhone II**	Software Ventures

MASS STORAGE*

Months on chart	Last month	This month		
17	1	1	**MacStack SD40**	CMS Enhancements
5	5	2	**UltraDrive 45**	GCC Technologies
4	—	3	**Platinum PI 40 (Internal)**	CMS Enhancements
1	—	4	**Q40X**	Total Peripherals
1	—	5	**Infinity 40 Turbo (Removable)**	PLI

ADD-IN BOARDS

Months on chart	Last month	This month		
8	1	1	**Macintosh Display Card 8•24**	Apple Computer
9	3	2	**Pivot**	Radius
3	4	3	**Macintosh IIsi NuBus Adapter Card**	Apple Computer
10	2	4	**Radius TPD Interface**	Radius
1	—	5	**Apple Ethernet LC Card**	Apple Computer

UTILITY SOFTWARE

Months on chart	Last month	This month		
15	1	1	**SAM II**	Symantec Corporation
9	3	2	**The Norton Utilities for the Macintosh**	Symantec Corporation
15	2	3	**SUM II**	Symantec Corporation
2	4	4	**After Dark**	Berkeley Systems
8	—	5	**Virex**	Microcom

PRODUCT WATCH

Recent or forthcoming products of particular interest.

Mr. X *Educorp*
CD ROM version of popular comic book in English and Japanese

Desert Storm *Warner New Media*
Time Magazine's new CD ROM on the Gulf War

Timbuktu 4.0 *Farallon Computing*
Color version of remote-control software

Source: Exclusive InfoCorp survey of more than 125 Macintosh retailers and selected mail-order vendors. Covers sales during March 1991.

*Does not include hard drives installed at the factory.

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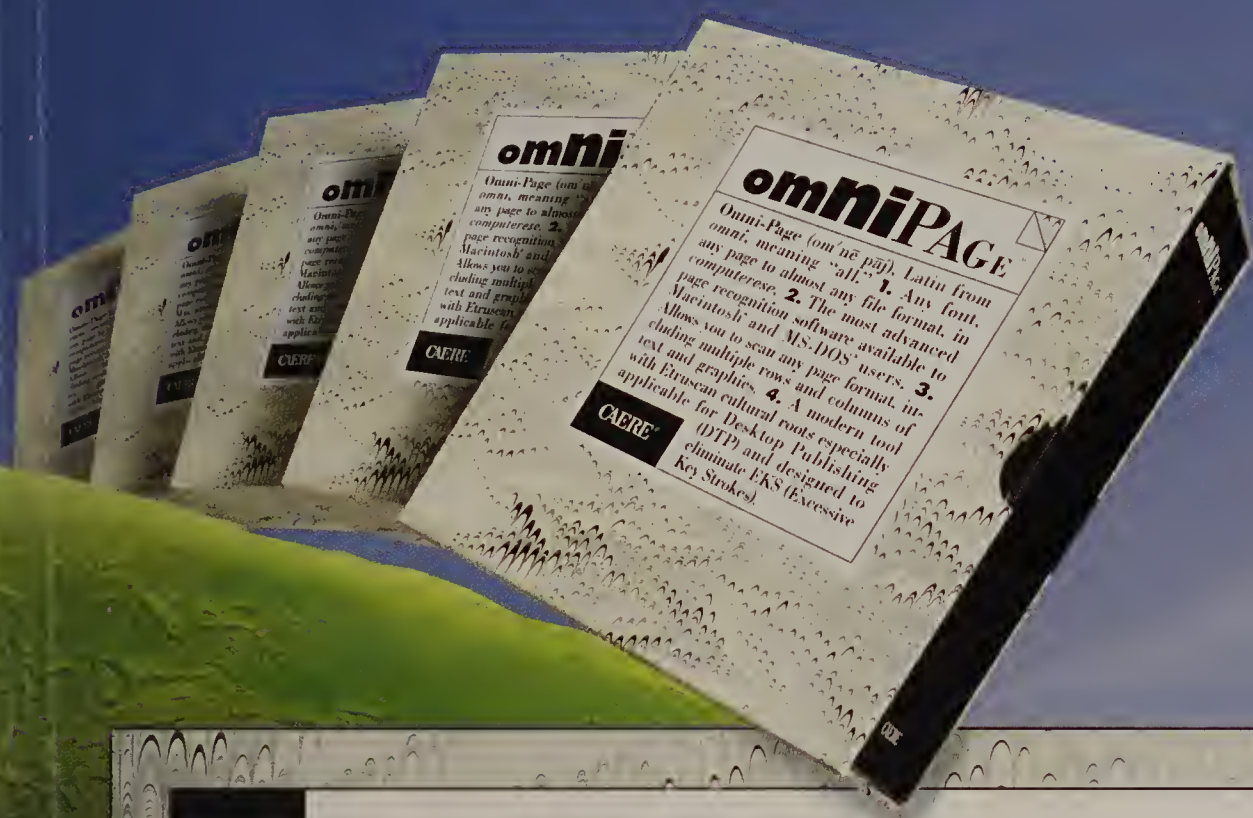

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What makes Turbo Mouse outshine the rest?

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Press both buttons simultaneously, and our time-saving chording feature executes one of seven useful commands such as "save," "print," "quit," or "undo."

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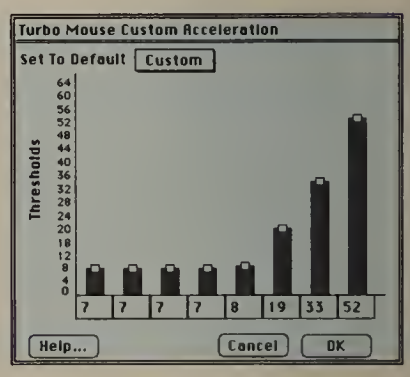

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The next time you read another claim for a trackball, remember the one that has earned all the acclaims. Turbo Mouse.

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